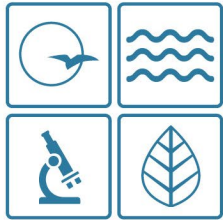




Air Pollution Control Program

Missouri Air Monitoring Network Assessment 2025

August 4, 2025



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Mike Kehoe
Governor

Kurt U. Schaefer
Director

August 4, 2025

Jim Macy
Regional Administrator
U.S. Environmental Protection Agency
11201 Renner Boulevard
Kansas City, KS 66219

Dear Jim Macy:

Please find enclosed the Missouri 2025 Monitoring Network Assessment.

This assessment fulfills the requirements of 40 CFR 58.10(d) for states to perform and submit to the U.S. Environmental Protection Agency (EPA) an assessment of the air quality monitoring network due every five years beginning July 1, 2010.

If you have questions regarding this letter or the enclosures, please contact Josh Vander Veen with the department's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102, or by telephone at 573-751-8328. Thank you.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Stephen M. Hall
Director

SMH:khd

Enclosure

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Executive Summary

Introduction

Each monitoring agency is required (40 CFR 58.10 (d)) to perform and submit to the Environmental Protection Agency (EPA) an assessment of the air quality monitoring network every five years to determine whether the network meets the monitoring objectives defined in 40 CFR 58 Appendix D, whether new sites are needed, whether existing sites are no longer needed, and whether new technologies are appropriate for incorporation into the monitoring network. The first required assessment was completed in 2010, the second assessment was completed in 2015, and the third assessment was completed in 2020. This report presents the results of the 2025 assessment for Missouri. This assessment follows EPA Region 7 guidance. Recent changes or proposed changes in the National Ambient Air Quality Standards (NAAQS) must be considered in assessing the air quality monitoring network.

The assessment discusses Missouri population, climate, and new emission sources that are used to evaluate the network for monitoring of each of the following air pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter smaller than 10 micrometers (PM₁₀), ozone (O₃), particulate matter smaller than 2.5 micrometers (PM_{2.5}) and lead. This Executive Summary concludes with a table characterizing current monitoring sites as critical, credible or marginal for each pollutant.

Population

The assessment includes consideration of population distribution, since one of the goals of an air monitoring network is to assess population exposure. Also, some air pollutant emissions, especially from area and mobile sources, are associated with population. The 2024 population of Missouri was 6.2 million, an increase of 4% from the 2010 population. Missouri includes dominant population centers in the St. Louis and Kansas City areas, with the southwestern region (including Springfield and Joplin) also an area of some significance in population. The 2024 populations of the three largest metropolitan statistical areas (MSA) in Missouri were:

- St. Louis MSA (Missouri portion): 2.14 million
- Kansas City MSA (Missouri portion): 1.32 million
- Springfield MSA: 0.50 million

The largest recent and expected future growth in population is generally in suburban areas surrounding the St. Louis and Kansas City areas, not in the urban centers. Population growth is ongoing in the Springfield and Columbia areas.

Climate

Missouri is located in the middle of the North American continent and, therefore, normally experiences four full seasons, with extremes in temperature ranging from slightly above 100 degrees **Fahrenheit** (°F) to below 0°F. According to the official records temperatures in Missouri have risen almost 1°F since the beginning of the 20th century. Winter warming is reflected in a below average occurrence of very cold nights since 1990 according to the North Carolina Institute for Climate Studies (NCICS).

The typical duration and dominant climatology of the four seasons is:

- Spring: March to May, the wettest season, variable winds, temperature 77°F to 34°F.
- Summer: June to August, the Bermuda High sets up in the eastern Atlantic moving warm moist air from the Gulf of Mexico into the local area wind is generally from the south, temperature 89°F to 64°F.
- Fall: September to November, wind generally is from the south shifting to the northwest late in the season, temperature 80°F to 33°F.
- Winter: December to February, wind is generally from the northwest, temperature 49°F to 19°F.

Ozone episodes generally occur in the summer when high pressure sets up to the east of Missouri along with an upper-level ridge over the area. High temperature, abundant sunshine, and light winds are characteristic of such episodes and contribute to the formation and accumulation of ozone. PM_{2.5} levels, especially in the St. Louis area, are affected by regional weather patterns that bring air masses into Missouri from areas with emissions of PM_{2.5} precursors. For example, summertime high pressure systems are often centered over the Ohio River Valley area, which not only bring air masses from that SO₂ emissions-rich region into the St. Louis area, but also create local stagnant or nearly stagnant conditions that allow accumulation of both regional and locally generated air contaminants.

New Emission Sources

New large point emission sources are primarily those permitted under the Prevention of Significant Deterioration (PSD) program. Emission increases in this category do not appear significant enough to warrant additional monitoring at this time.

Carbon Monoxide

The primary NAAQS for CO are 35 parts per million (ppm) for one hour, and 9 ppm for eight hours. These concentrations must not be exceeded more than once per year. CO monitoring is required at the Blair Street NCore site and at the two initial near-roadway sites in the St. Louis and Kansas City areas (Forest Park and Linden Hills). CO is currently monitored at these three sites in Missouri. None of these sites reported a violation of the NAAQS in recent years.

CO is primarily emitted as a component of motor vehicle exhaust, so that CO emissions are correlated with vehicle miles, which are highest on major roadways in population centers.

Sulfur Dioxide

SO₂ is primarily emitted from coal or fuel oil combustion facilities, especially electric generating stations.

The SO₂ primary NAAQS is 75 parts per billion (ppb); the form of the standard is the 3-year average of the 99th percentile of annual daily maximum 1-hour averages. The rule that revised the NAAQS in 2010 includes minimum monitoring requirements based on a combination of population and SO₂ emissions in Core Based Statistical Areas (CBSAs). Three monitoring sites are required in Missouri CBSAs (two in the St. Louis area, one in the Kansas City Area). Each monitoring site may be determined on the basis of one or more of the following criteria: location near known emission sources, location to measure maximum concentrations, location to measure population exposure, location to measure regional transport, or location to measure regional background. The monitoring is to be supplemented by air quality simulation modeling of the impact of known SO₂ sources.

SO₂ is currently monitored by the Missouri Department of Natural Resources at six sites in Missouri, including three sites in the St. Louis area, one in Kansas City, and two in rural areas. SO₂ is also being monitored by utilities and other industrial facilities at 10 sites near emission sources. There were 13 SO₂ monitors operated by utilities/industrial facilities; however, three of the monitors were shut down in the spring of 2025 as a result of a site closure and low measured concentrations.

Most of these industrial sites began operation in 2017 to meet the requirements of the 2015 Data Requirements Rule (DRR). Of these, three sites in New Madrid County near the former Magnitude 7 Metals facility are in violation of the standard based on 2021 through 2023 data. The area is designated as nonattainment for the 1-hour SO₂ NAAQS. All other areas in Missouri are designated as attainment/unclassifiable/maintenance areas for the 1-hour SO₂ NAAQS.

The Blair Street site in St. Louis is an NCore site, which requires SO₂ monitoring. The Blair Street site also doubles as a population-oriented site. Three of the current state-operated sites at Mott Street, Troost, and Buick Northeast, are source-oriented sites that should be continued.

Nitrogen Dioxide

Nitrogen oxide (NO_x) is emitted from a variety of source types: point (electricity generating stations and other stationary combustion sources), mobile (motor vehicles), and low level area sources. Some of the larger sources and a concentration of relatively smaller sources are located within the St. Louis, Kansas City and Springfield urban areas. Some large sources are located outside the urban areas, especially along the Missouri and Mississippi rivers. Point source NO_x emissions have generally decreased in recent years but increased slightly over the last few years. Mobile source NO_x emissions generally correlate with vehicular traffic density and area source emissions generally correlate with population.

The NO₂ primary NAAQS is 100 ppb; the form of the standard is the 3-year average of the 99th percentile of annual daily maximum 1-hour averages. There is also an annual average NAAQS of 53 ppb. The rule that revised the NAAQS in 2010 includes minimum monitoring requirements. Two near-road sites are required in the St. Louis area and one in the Kansas City area. A minimum of one population-oriented monitor must be sited in any urban area with population greater than or equal to 1 million people. A Photochemical Assessment Monitoring Station (PAMS) is required in the St. Louis ozone nonattainment area. Additional monitors are to be sited to monitor exposure to susceptible and vulnerable communities.

NO₂ is currently monitored by the department at eight sites in Missouri, five sites in the St. Louis area (two of which are near road), two in the Kansas City area (one of which is near road), and one in a rural area. None of these sites is in violation of either the annual or 1-hour standard.

The Blair and Troost sites are judged to be critical because they are located in part to evaluate population exposure within the St. Louis and Kansas City urban areas, respectively. The Forest Park, Linden Hills, and Rider Trail sites are also critical because they meet the requirement for near-road monitoring. The Mark Twain State Park site is judged to be credible to critical because it meets the need for measurement of regional background NO₂ concentrations. The West Alton and Arnold West sites are critical parts of the Enhanced Monitoring Plan.

In addition to these NO₂ monitoring sites, NO_x/NO_y (NO_y represents total reactive nitrogen oxides) monitoring is being done as required at the Blair Street NCore/PAMS site. This monitoring is also critical.

PM₁₀

PM₁₀ point sources are concentrated in the St. Louis, Kansas City, and Springfield areas. Mobile source PM₁₀ emissions generally are related to vehicular traffic density, and area source emissions generally are related to population.

The PM₁₀ NAAQS is a 24-hour average of 150 micrograms per cubic meter (µg/m³), not to be exceeded more than once per year. There are minimum monitoring requirements for PM₁₀ in each MSA, based on MSA population and the monitored PM₁₀ concentrations. A minimum of four to eight sites is required to monitor PM₁₀ levels in the Kansas City area and zero to one in the Springfield area.

The Branch Street site in the St. Louis area is exceeding 120% of the standard. St. Louis area falls into the 'High' category in 40 CFR Part 58 Appendix D, requiring six to ten monitors. In the 2024 Monitoring Network Plan approval letter, EPA Region 7 stated:

The Branch Street monitoring site ambient PM₁₀ 24-hour average concentrations have exceeded the PM₁₀ NAAQS by at least 20% in recent years, including this year when currently uncertified data preliminarily shows several occurrences. While this meets the criteria for 'High concentration' and would increase the minimum number of monitors in 40 CFR 58 Appendix D Section 4.6, we note that the elevated concentrations and their causes appear to be localized and likely controllable with efforts by Missouri and Region 7 to obtain emissions

reductions. Having consulted with EPA Region 5, we encourage Missouri to prioritize work to reduce concentrations and eliminate the requirement to install an additional monitor. Reducing emissions from localized sources affecting the monitor will provide a greater air quality benefit to the public than the installation of an additional monitor in the MSA. Please continue to coordinate with Region 7 staff on this issue.

The department agrees with this approach and will continue to work towards this goal to focus resources on reducing emissions around the Branch Street monitor instead of adding additional PM₁₀ monitors to the St. Louis area. The department will continue to coordinate with EPA Region 7 on this issue.

PM₁₀ is currently monitored by the department at nine sites in Missouri, three sites in the St. Louis area (a fourth site is operated by the State of Illinois), two sites in the Kansas City area (two additional sites operated by the State of Kansas, bringing the total to four), one site in Springfield, and three sites in other areas. The Branch St. monitor in St. Louis is currently in violation of the PM₁₀ NAAQS. The Carthage, Front St., and St. Joseph Pump Station sites have exceeded the PM₁₀ NAAQS since the last assessment, but they have not violated the standard.

The Blair Street site in St. Louis is an NCore site, which requires PM₁₀ monitoring. The Branch Street and Carthage sites are source-oriented sites considered to be critical. The St. Joseph Pump Station and Front Street sites have shown high enough concentrations that they should be maintained. The Mark Twain State Park site is considered to be critical as a monitor of regional background concentrations. The Troost site measures lower values, so is considered critical in order to maintain monitoring of population exposure in the Kansas City area and to meet minimum network requirements. The Arnold West site is critical as a background site for the St. Louis area. The Hillcrest High School site is critical as the only site in the Springfield area.

Ozone

Nitrogen oxides (NO_x) and VOC emissions contribute to formation of ozone in the atmosphere. NO_x emissions are discussed above. VOC point source emissions are concentrated in the larger urban areas in Missouri and have shown a decrease in recent years. Area source VOC emissions correlate with population, and mobile source emissions, like those of NO_x, correlate with vehicle miles.

The ozone primary NAAQS is an 8-hour average of 0.070 ppm (70 ppb), three-year average of fourth highest annual average.

Ozone is currently monitored at 22 sites in Missouri. Seven sites are in the St. Louis area, and five are in the Kansas City area. Ste. Genevieve County and the southeast areas each have one site. Two sites are in Springfield, and there are six sites in other areas of the state.

In the St. Louis area, Arnold West, Blair St., Maryland Heights, and West Alton violated the NAAQS in recent years. In the Kansas City area, Rocky Creek and Liberty violated the NAAQS in recent years. The Farrar site in Perry County violated the standard during the 2021-2023 period. All of the other ozone sites in Missouri were in attainment of the standard in recent years.

It is important to note that many of the recent violations are believed to have occurred as a result of pollution contributions from wildfires in 2023.

Based on minimum monitoring requirements and measured O₃ levels near and above the standard, all of the current sites are considered to be critical.

PM_{2.5}

Airborne PM_{2.5} at Missouri sites is dominated by the impact of regional or urban-scale influences (some of which are outside of Missouri) and by the contribution of secondary sources. However, primary PM_{2.5} sources also contribute; identified point sources are generally distributed along the Missouri and Mississippi rivers.

The level of the PM_{2.5} annual primary standard is 9 µg/m³. The level of the annual secondary standard is 15 µg/m³. The form of both annual standards is the annual mean averaged over three years. The level of the 24-hour primary and secondary standards is 35 µg/m³. The form of the 24-hour standards is the three-year average of the annual 98th percentile of 24-hour averages.

PM_{2.5} is monitored at 15 sites in Missouri; including 13 sites for NAAQS compliance determination and two IMPROVE sites, though one of the improve sites is currently offline due to damage from a tornado. Six sites are in the St. Louis area, and four are in the Kansas City area. One site is in the Springfield area, one is in the St. Joseph area, and one is in a rural area. There are also PM_{2.5} speciation samplers at Blair Street and Arnold West.

With the exception of the Blair St. site, all Missouri monitors meet the annual standard for recent years., All Missouri monitors also meet the 24-hour standard for all recent periods.

It is important to note that the recent violation at Blair St. may have from potential wildfire contributions to air pollution in 2023.

All of the Missouri PM_{2.5} sites are considered to be critical, in part because of specific minimum monitoring requirements.

Lead

The level of the primary NAAQS for airborne lead is 0.15 µg/m³, measured as total suspended particulate matter (TSP). The averaging time is rolling three-month averages of monthly averages, evaluated over a three-year period. At a minimum, monitors must be placed in areas potentially impacted by sources of lead emissions greater than or equal to one-half ton per year (tpy).

According to the 2020 National Emissions Inventory (NEI), identified emission sources that may approach or exceed one-half tpy of lead emissions include the secondary smelters at Buick and the Buick Mill in the New Lead Belt area.

Lead is currently being monitored by the department at six monitoring sites in Missouri: three in the Herculanum area, two in the new lead belt area, and one near a secondary lead smelter in northwest

Missouri. Lead monitoring sites are also operated by industries in some of these areas. Monitors in the Herculaneum area and near the two secondary lead smelters in Missouri have shown violations of the standard in the past. In recent years, the primary smelter in Herculaneum has ceased operation. Additionally, the secondary smelters have reconfigured their processes and/or installed additional emission controls.

A violation of the lead NAAQS occurred at the department operated Buick Northeast site in 2024. It is important to note that the department's Buick Northeast site operates on a one-in-six day schedule. Doe Run operates a monitor at the same site which collects samples every day. The Doe Run operated site did not show a violation of the NAAQS. The department is actively working with EPA Region 7 to determine how to manage this conflicting data. If EPA Region 7's response is that the data may be combined, the department will evaluate whether it is appropriate/possible to combine the data going forward.

The department operated Sherman site in the Herculaneum area has been determined to be no longer necessary due to the closure of the Doe Run Herculaneum facility and consistent readings well below the lead NAAQS. The department to propose removing the monitor as a part of the 2025 Monitoring Network Plan.

Because of monitoring requirements as described above and because of recent violations of the standard, which must be evaluated over at least three years, at some sites, all of the other lead monitoring sites are considered to be critical. Some of the sites can, however, be re-evaluated in a few years if emissions estimates change and the sites continue to show attainment of the standard.

Summary Tables

Table ES-1 summarizes the assessment of current state air monitoring sites in Missouri for CO, SO₂, NO₂, PM₁₀, O₃, PM_{2.5} and lead. Existing sites are characterized as critical or credible for each pollutant. No sites or pollutants are characterized as marginal, because changes in the network about 2010 eliminated marginal sites or pollutants. The table also includes brief comments generally stating the primary reason for each site.

Table ES-2 lists the industry-operated air monitoring sites in Missouri that provide data reported into the EPA air quality system (AQS) database for either SO₂ or lead. SO₂ sites are either Data Requirements Rule (DRR) sites or other sites operated under a consent agreement in a manner consistent with DRR requirements. Most of the lead sites are required by consent agreements or consent judgments.

Table ES-1a. Summary of Monitoring Site Assessments for Current State Sites - St. Louis Area								
Site	CO	SO ₂	NO ₂	PM ₁₀	O ₃	PM _{2.5}	Lead	Comments
Arnold West			critical	credible	critical	critical		Upwind of central St. Louis, PM _{2.5} speciation
Blair Street (NCore)*	critical	critical	critical	critical	critical	critical		NCore, NO ₂ population exposure, PM _{2.5} speciation, NATTS, PAMS
Branch Street				critical		critical		Source oriented
Foley West					critical			Ozone nonattainment extent
Forest Park	critical		critical			critical		Near-road
Ladue						critical		High PM _{2.5} removal bias
Maryland Heights*					critical			Ensure maximum O ₃ concentration is measured
Orchard Farm*					critical			Ensure maximum O ₃ concentration is measured
Padfic*					critical			Upwind of central St. Louis; regional background
Rider Trail I-70		credible	critical					Second near-road; SPM for SO ₂
South Broadway						critical		Upwind of central St. Louis
West Alton*			critical		critical			Historical design value site
*In ozone nonattainment area								
Table ES-1b. Summary of Monitoring Site Assessments for Current State Sites - Kansas City Area								
Site	CO	SO ₂	NO ₂	PM ₁₀	O ₃	PM _{2.5}	Lead	Comments
Troost		critical	critical	critical		critical		Required for SO ₂ maintenance area
Front Street				critical				Source oriented
Linden Hills	critical		critical			critical		Near-road
Liberty					critical	critical		At or near KC area ozone design value
Trimble					critical			At or near KC area ozone design value
Watkins Mill					critical			At or near KC area ozone design value
Rocky Creek					critical			At or near KC area ozone design value
Richards Gebaur-South					critical	critical		Upwind of central KC area
Table ES-1c. Summary of Monitoring Site Assessments for Current State Sites - Springfield Area								
Site	CO	SO ₂	NO ₂	PM ₁₀	O ₃	PM _{2.5}	Lead	Comments
Hillcrest High School				critical	critical	critical		Springfield ozone design value; 2 ozone sites required
Fellows Lake					critical			Springfield ozone design value; 2 ozone sites required

Table ES-1d. Summary of Monitoring Site Assessments for Current State Sites - Herculaneum Area								
Site	CO	SO ₂	NO ₂	PM ₁₀	O ₃	PM _{2.5}	Lead	Comments
Sherman**							marginal	Source oriented; recommended for removal
Dunklin High School**							critical	Source oriented
Mott Street**		critical					critical	Source oriented
**In lead nonattainment area								
Table ES-1e. Summary of Monitoring Site Assessments for Current State Sites - Remainder of State								
Site	CO	SO ₂	NO ₂	PM ₁₀	O ₃	PM _{2.5}	Lead	Comments
Alba					critical			Potential maximum area ozone
Bonne Terre					critical			St.Louis background ozone
Buick NE**		critical					critical	Source oriented
Carthage				critical				Source oriented
Eldorado Springs					critical	critical		Western Missouri regional background
Forest City							critical	Source oriented
Farrar					critical			Potential maximum area ozone
Finger Lakes					critical			Potential maximum area ozone
Fletcher							critical	Source oriented
Mark Twain State Park		credible-critical	credible-critical	critical	critical			Regional background
New Bloomfield					critical			Potential maximum area ozone
Oates**							critical	Source oriented
Savannah					critical			Potential maximum area ozone
St. Joseph Pump Station				critical		critical		Meets minimum area requirement
**In lead nonattainment area								

Table ES-2. Summary of Industry Operated Monitoring Sites			
Site	SO ₂	Lead	Comments
Doe Run BRRF County Road 75	critical		Data Requirements Rule (DRR) site
Doe Run BRRF Highway 32	critical		DRR site
Doe Run BRRF W. Entrance	critical		DRR site
Magnitude 7 Metals Site 1	critical		DRR site
Magnitude 7 Metals Site 2	critical		DRR site
Magnitude 7 Metals Site 3	critical		DRR site
Ameren Labadie Valley	critical		DRR site
Ameren Labadie Northwest	critical		DRR site
Ameren Labadie North	critical		DRR site
Ameren Labadie Southwest	critical		DRR site
Herculaneum-Dunklin High School		critical	Monitoring required by consent judgment
Herculaneum-Mott Street (City Hall)		critical	Monitoring required by consent judgment
Herculaneum-North Cross		critical	
Buick North		critical	non-ambient site*, monitoring required by consent judgment
Buick South		critical	non-ambient site*, monitoring required by consent judgment
Buick Northeast		critical	
*Non-ambient sites are within facility fence lines, not open to the public. Monitoring may be required at these sites by a consent agreement.			

1.0 Background and Introduction

1.1 Regulatory Requirements

The regulatory requirement for an air monitoring network assessment is found in 40 CFR 58.10 (d) which states:

The State, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma) and other at-risk populations, and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby States and Tribes or health effects studies. The State, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every 5 years beginning July 1, 2010.

This document is intended to meet this requirement. This is the fourth network assessment required by the regulation; the first one was completed in 2010, the second in 2015, and the third in 2020.

Additionally, 40 CFR Part 58 Appendix D.5(h) states:

States with Moderate and above 8-hour O₃ nonattainment areas and states in the Ozone Transport Region as defined in 40 CFR 51.900 shall develop and implement an Enhanced Monitoring Plan (EMP) detailing enhanced O₃ and O₃ precursor monitoring activities to be performed. The EMP shall be submitted to the EPA Regional Administrator no later than October 1, 2019 or two years following the effective date of a designation to a classification of Moderate or above O₃ nonattainment, whichever is later. At a minimum, the EMP shall be reassessed and approved as part of the 5-year network assessments required under 40 CFR 58.10(d). The EMP will include monitoring activities deemed important to understanding the O₃ problems in the state. Such activities may include, but are not limited to, the following:

- (1) Additional O₃ monitors beyond the minimally required under paragraph 4.1 of this appendix,*
- (2) Additional NO_x or NO_y monitors beyond those required under 4.3 of this appendix,*
- (3) Additional speciated VOC measurements including data gathered during different periods other than required under paragraph 5(g) of this appendix, or locations other than those required under paragraph 5(a) of this appendix, and*
- (4) Enhanced upper air measurements of meteorology or pollution concentrations.*

The St. Louis, MO-IL area is in nonattainment with the 2015 National Ambient Air Quality Standard for Ozone (O₃). The ozone nonattainment area was upgraded from marginal to moderate effective November 7, 2022. The initial EMP was submitted to EPA on October 11, 2024. A revised EMP is included in Appendix C satisfying the requirement of 40 CFR Part 58 Appendix D.5(h).

1.2 Assessment Approach

Assessment of various portions of the air monitoring network in Missouri have been a part of past planning documents, including annual Monitoring Network Plans and past Air Monitoring Network Assessments. Changes in the network since the 2020 assessment, documented in annual network plans, have been made based in part on past assessments, changes in regulations, and changes in the availability of resources. Some of the changes, including discontinuance of some monitors after 2020 will be evident in the air monitoring data presented in the following sections.

This assessment is intended to be consistent with the EPA Region 7 guidance issued in advance of the 2010 Network Assessment (Appendix B).

This assessment includes analysis of SO₂, NO₂, PM₁₀, CO, O₃, PM_{2.5}, and Pb monitoring networks.

In addition to identification of monitoring sites in the subsequent sections, Appendix D, the Network Table, includes a complete list of monitoring sites, location of the sites, parameters being monitored, etc., in Missouri.

2.0 Population

The estimated Missouri population in 2024 was 6,245,466, an increase of 4% from 2010 or of 1% from 2020. Statewide population growth is slowing; the Missouri population grew 7% from 2000 to 2010 as noted in the 2020 Network Assessment.

Figure 2-1 shows Missouri Core Based Statistical Areas (CBSAs) as defined in 2023. CBSAs include Metropolitan Statistical Areas (MSAs), with population of 50,000 or more and Micropolitan Statistical Areas, with populations of 10,000 or more but less than 50,000. Each CBSA includes one or more counties. Table 2-1 lists the 2024 populations of the Missouri portion of each of the Missouri MSAs. In summary, 4.7 million of the 6.2 million persons in Missouri lived in the eight MSAs that lie in whole or in part in Missouri. 2.1 million of these persons lived in the Missouri portion of the St. Louis MSA, and 1.3 million lived in the Missouri portion of the Kansas City MSA.

Table 2-2 lists the 2010, 2020, and estimated 2024 populations. Table 2-2 also lists population change and the percentage change in population for each Missouri county from 2010 to 2020. Figure 2-2 shows the 2024 population by county, and Figure 2-3 shows the percentage changes from 2010 to 2020 by county. In the vicinity of the large urban areas, the principal growth areas were not in the urban core, but in suburban areas. Other growth areas included the Springfield and Columbia areas.

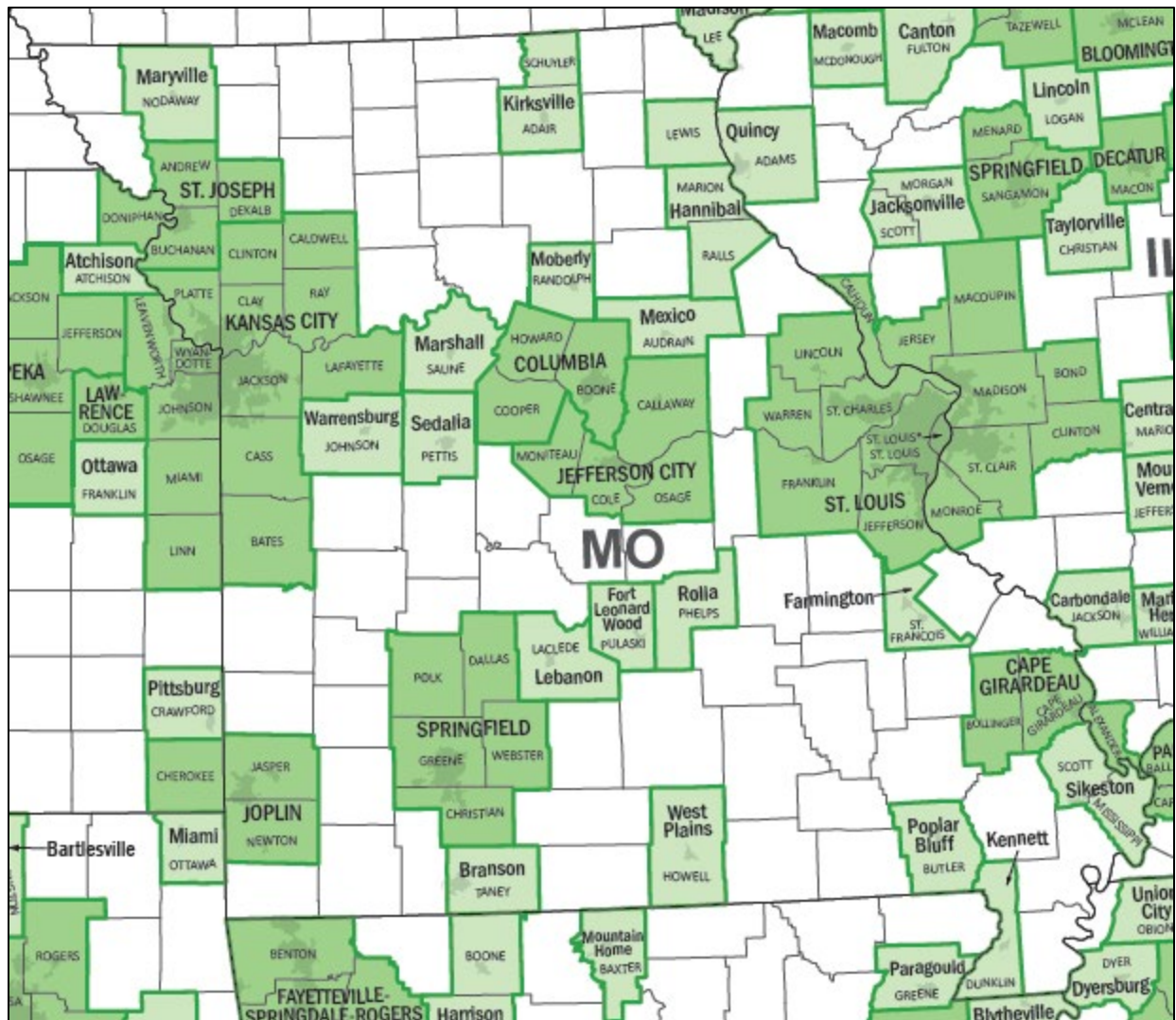


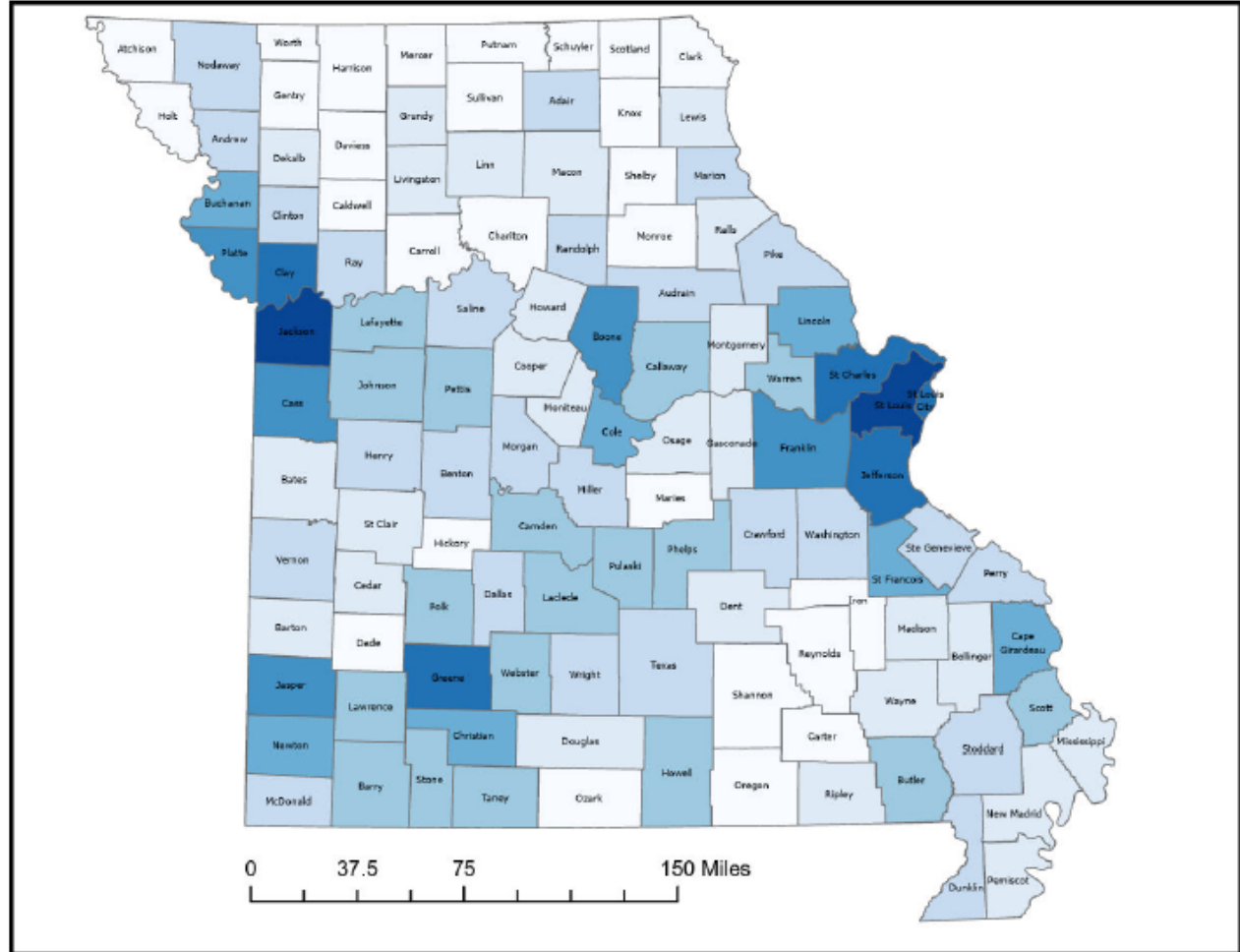
Figure 2-1. Missouri portion of July 2023 CBSA map. MSAs are shaded dark green, micropolitan statistical areas are shaded light green, and CBSA boundaries are shown as green lines.

Table 2-1.	
2024 Population in Missouri	
Metropolitan Statistical Area (MSA)	Population in MO Portion
St. Louis (part)	2,139,860
Kansas City (part)	1,321,637
Springfield	496,975
Columbia	219,426
Joplin (part)	187,998
Jefferson City	151,523
St. Joseph (part)	111,549
Cape Girardeau (part)	94,268
Total	4,723,236

Table 2-2.					
Missouri County Population Change 2010 to 2020 & 2024 Estimated Population					
Name	2010 Population	2020 Population	2010 to 2020 Population Change	2010 to 2020 Percent Change	2024 Estimated Population
Adair	25,607	25,272	-335	-1%	25,660
Andrew	17,291	18,102	811	5%	18,091
Atchison	5,685	5,305	-380	-7%	5,139
Audrain	25,529	24,781	-748	-3%	24,304
Barry	35,597	34,542	-1,055	-3%	35,618
Barton	12,402	11,623	-779	-6%	11,717
Bates	17,049	16,053	-996	-6%	16,394
Benton	19,056	19,425	369	2%	20,614
Bollinger	12,363	10,555	-1,808	-15%	10,610
Boone	162,642	184,050	21,408	13%	192,154
Buchanan	89,201	84,472	-4,729	-5%	83,574
Butler	42,794	42,063	-731	-2%	41,814
Caldwell	9,424	8,821	-603	-6%	9,000
Callaway	44,332	44,346	14	0%	45,126
Camden	44,002	42,807	-1,195	-3%	44,135
Cape Girardeau	75,674	81,824	6,150	8%	83,658
Carroll	9,295	8,464	-831	-9%	8,414
Carter	6,265	5,205	-1,060	-17%	5,359
Cass	99,478	108,162	8,684	9%	113,873
Cedar	13,982	14,214	232	2%	15,023
Chariton	7,831	7,390	-441	-6%	7,397
Christian	77,422	89,294	11,872	15%	96,045
Clark	7,139	6,658	-481	-7%	6,623
Clay	221,939	254,145	32,206	15%	263,370
Clinton	20,743	21,218	475	2%	21,721
Cole	75,990	76,624	634	1%	77,625
Cooper	17,601	16,647	-954	-5%	17,122
Crawford	24,696	23,036	-1,660	-7%	22,808
Dade	7,883	7,586	-297	-4%	7,622
Dallas	16,777	17,132	355	2%	17,877
Daviess	8,433	8,433	0	0%	8,541
DeKalb	12,892	11,596	-1,296	-10%	9,884
Dent	15,657	14,389	-1,268	-8%	14,721
Douglas	13,684	11,600	-2,084	-15%	12,290
Dunklin	31,953	28,216	-3,737	-12%	27,002
Franklin	101,492	104,867	3,375	3%	107,256
Gasconade	15,222	14,763	-459	-3%	14,655
Gentry	6,738	6,136	-602	-9%	6,298
Greene	275,174	299,332	24,158	9%	307,942
Grundy	10,261	9,757	-504	-5%	9,766
Harrison	8,957	8,157	-800	-9%	8,186
Henry	22,272	21,982	-290	-1%	22,575
Hickory	9,627	8,298	-1,329	-14%	8,766
Holt	4,912	4,191	-721	-15%	4,241
Howard	10,144	10,157	13	0%	10,150
Howell	40,400	39,806	-594	-1%	40,762
Iron	10,630	9,513	-1,117	-11%	9,420
Jackson	674,158	717,662	43,504	6%	727,362
Jasper	117,404	122,896	5,492	5%	126,479
Jefferson	218,733	226,947	8,214	4%	231,888
Johnson	52,595	54,039	1,444	3%	55,880
Knox	4,131	3,739	-392	-9%	3,740
Laclede	35,571	36,046	475	1%	36,738
Lafayette	33,381	33,050	-331	-1%	33,511
Lawrence	38,634	37,998	-636	-2%	39,151
Lewis	10,211	10,039	-172	-2%	9,852
Lincoln	52,566	59,857	7,291	14%	65,888
Linn	12,761	11,857	-904	-7%	11,910
Livingston	15,195	13,990	-1,205	-8%	14,658

Table 2-2. Continued					
McDonald	23,083	23,278	195	1%	24,054
Macon	15,566	15,199	-367	-2%	15,177
Madison	12,226	12,625	399	3%	12,852
Maries	9,176	8,451	-725	-8%	8,506
Marion	28,781	28,493	-288	-1%	28,425
Mercer	3,785	3,512	-273	-7%	3,452
Miller	24,748	24,778	30	0%	25,668
Mississippi	14,358	12,121	-2,237	-16%	11,750
Moniteau	15,607	15,216	-391	-3%	15,294
Monroe	8,840	8,693	-147	-2%	8,890
Montgomery	12,236	11,286	-950	-8%	11,511
Morgan	20,565	21,001	436	2%	22,399
New Madrid	18,956	16,329	-2,627	-14%	15,212
Newton	58,114	58,699	585	1%	61,519
Nodaway	23,370	20,999	-2,371	-10%	20,503
Oregon	10,881	8,611	-2,270	-21%	8,699
Osage	13,878	13,255	-623	-4%	13,478
Ozark	9,723	8,519	-1,204	-12%	9,090
Pemiscot	18,296	15,589	-2,707	-15%	14,407
Perry	18,971	18,971	0	0%	19,100
Pettis	42,201	43,004	803	2%	43,791
Phelps	45,156	44,568	-588	-1%	45,672
Pike	18,516	17,413	-1,103	-6%	17,961
Platte	89,322	107,190	17,868	20%	113,207
Polk	31,137	31,616	479	2%	33,070
Pulaski	52,274	54,039	1,765	3%	53,964
Putnam	4,979	4,685	-294	-6%	4,539
Ralls	10,167	10,354	187	2%	10,499
Randolph	25,414	24,457	-957	-4%	24,077
Ray	23,494	23,135	-359	-2%	23,199
Reynolds	6,696	6,079	-617	-9%	5,927
Ripley	14,100	10,670	-3,430	-24%	10,715
St. Charles	360,485	406,423	45,938	13%	423,726
St. Clair	9,805	9,346	-459	-5%	9,848
Ste. Genevieve	18,145	18,478	333	2%	18,546
St. Francois	65,359	66,446	1,087	2%	67,503
St. Louis	998,954	1,003,376	4,422	0%	992,929
Saline	23,370	23,339	-31	0%	23,325
Schuyler	4,431	4,010	-421	-10%	4,069
Scotland	4,843	4,705	-138	-3%	4,698
Scott	39,191	38,022	-1,169	-3%	37,957
Shannon	8,441	7,035	-1,406	-17%	7,275
Shelby	6,373	6,095	-278	-4%	5,926
Stoddard	29,968	28,650	-1,318	-4%	28,438
Stone	32,202	31,205	-997	-3%	32,630
Sullivan	6,714	5,976	-738	-11%	5,750
Taney	51,675	56,064	4,389	8%	56,744
Texas	26,008	24,323	-1,685	-6%	25,715
Vernon	21,159	19,675	-1,484	-7%	19,787
Warren	32,513	35,740	3,227	10%	38,478
Washington	25,195	23,432	-1,763	-7%	23,583
Wayne	13,521	10,935	-2,586	-19%	10,820
Webster	36,202	39,008	2,806	8%	42,041
Worth	2,171	1,968	-203	-9%	1,872
Wright	18,815	18,214	-601	-3%	19,505
St. Louis city	319,294	300,315	-18,979	-6%	279,695
Missouri	5,988,927	6,154,744	165,817	3%	6,245,466

Missouri Estimated Population by County, 2024



2024 Population Estimate

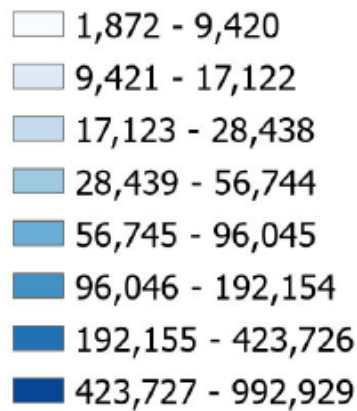
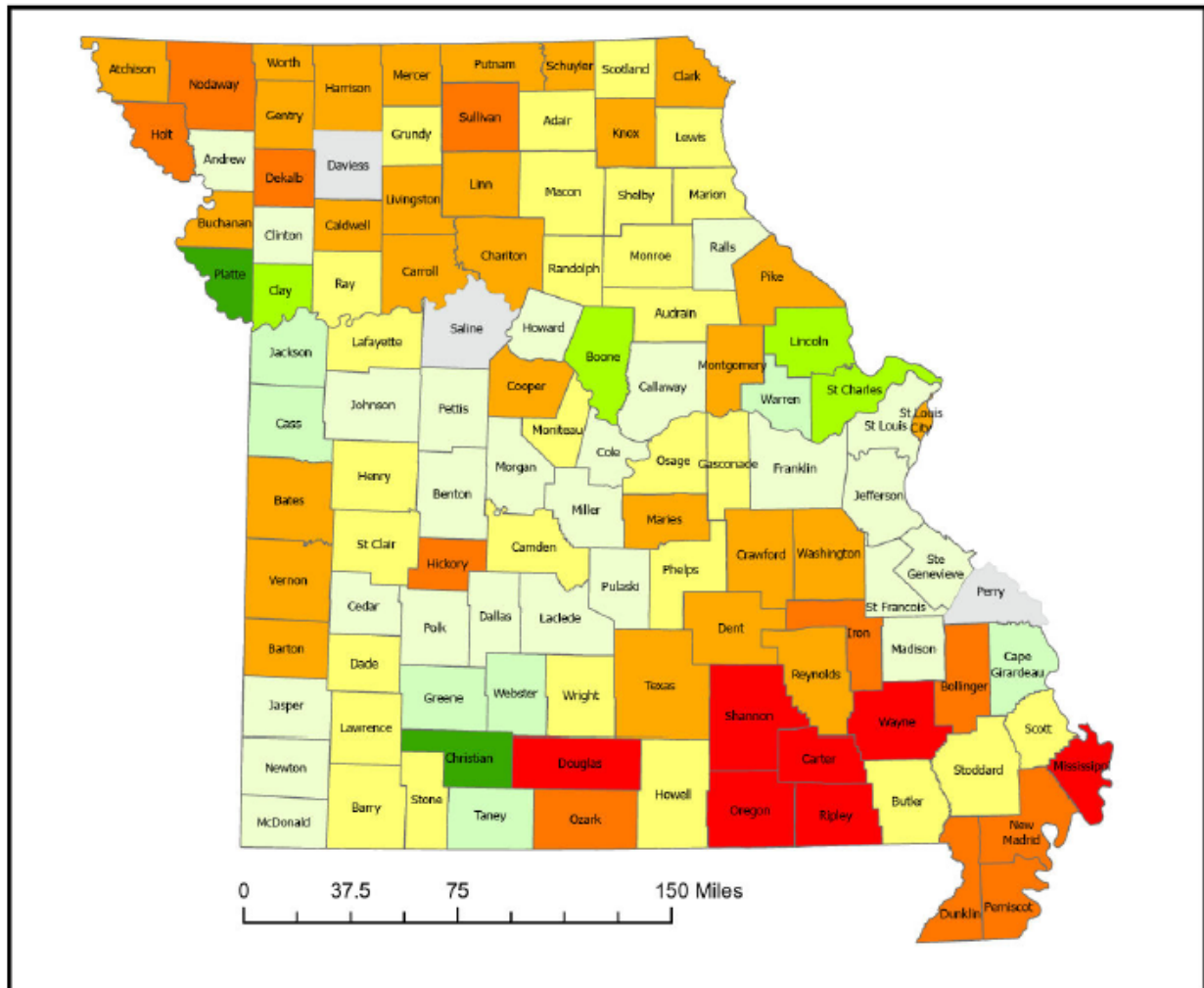


Figure 2-2. Missouri Estimated Population by County, 2024

Missouri County Population Percent Change, 2010-2020



County Population Percent Change, 2010-2020

- -25% to -15%
- -14.9% to -10%
- -9.9% to -5%
- -4.9% to -1%
- -0.9% to 0%
- 0.1% to 5%
- 5.1% to 10%
- 10.1% to 15%
- 15.1% to 21%



Figure 2-3. Missouri County Population Change, 2010 to 2020

3.0 General Climate of Missouri

Missouri is located in the middle of the North American continent and normally has the full four seasons of spring, summer, fall and winter. Summers are normally hot and humid and winters are cool to cold. Due to the location in the interior United States, Missouri often experiences extreme temperatures that can range throughout the year from 100 degrees Fahrenheit (°F) or greater to below 0°F. Not having either large mountains or oceans nearby to moderate the temperatures, the climate is influenced by air from the cold arctic in the winter to hot humid Gulf of Mexico air during the summer. There can be exceptionally high or low readings in temperatures throughout the year. Missouri will occasionally receive the remains of hurricanes. Thunderstorms also have occurred every month of the year.

3.1 Spring

Spring ranges from March through May and is normally the wettest season of the year as the jet stream fluctuates and develops disturbances along its path. Winds will range throughout the compass as systems move through.

Average Temperature Ranges: 77°F to 34°F.

3.2 Summer

Summer normally runs from June through August, with less precipitation, as high pressure usually dominates the area with warm moist air being moved in from the Gulf of Mexico. Winds are generally from a southerly component.

Average Temperature Ranges: 89°F to 64°F.

3.3 Fall

Fall is considered from September to November. At this time of year temperatures may exceed 80°F early on in the fall season, but will normally drop slowly toward the end of fall. Winds normally are still from the southern component, but will slowly shift to a more northwesterly component later in the season as the jet stream shifts south.

Average Temperature Ranges: 80°F to 33°F.

3.4 Winter

Winter is classified as running from December through February. Normally the northern portion of the state receives most of the frozen precipitation, but occasionally with the location of the jet stream and fluctuations of it, southern Missouri may receive more. Winds are generally from a northwesterly component, but occasionally winds will become southerly allowing for a slight warming period. Average Temperature Ranges: 49°F to 19°F.

3.5 Ozone

Generally, ozone episodes occur in the summer when high pressure moves to the east of Missouri along with an upper level ridge over the area. Ozone may form in the spring and fall but mainly during the summer months. Temperatures will be allowed to increase, and abundant sunshine will prevail. Winds will generally be calm to light and from a southerly component. With the downward motion of the air an inversion will set up and hold the air stagnant and trapped allowing for readings to increase. This is the predominant condition, but there have been other conditions when an episode has occurred such as air transport. Fires and controlled burns have also influenced high readings at times.

3.6 PM_{2.5}, SO₂, and NO_x

Both local surface meteorology and transport can affect PM_{2.5} levels. Regional weather patterns bring air masses into St. Louis from various emission source regions, including those with large SO₂ and NO_x precursor gases, and some sources of direct PM_{2.5}. The PM_{2.5} which moves over a moderately stable air mass (light surface winds) located over an area will allow infusion of the fine particle laden air to settle into the area. For example, summertime high pressure systems are often centered over the Ohio Valley area that not only bring air masses from the SO₂ emissions-rich regions of the Ohio River Valley and Tennessee Valley into St. Louis, but also create local conditions that are often stagnant or nearly stagnant. NO_x transport is not so clearly defined, although it can occur from north and northwest, or the south and southwest.

3.7 Wind Roses (Appendix A)

Wind roses based on data from major airports were selected to represent regions in Missouri. The selected airport representing the west was Kansas City International Airport (KMCI). For the south, the Springfield Airport (KSGF) was selected. Lambert-St. Louis International Airport (KSTL) was selected for the east, and Kirksville Airport (KIRK) was selected for the outstate region. Airport sites report official weather observations for the National Weather Service, and data are archived at the National Centers for Environmental Information (NCEI), previously the National Climatic Data Center (NCDC) for easy access.

4.0 New Emission Sources

New larger emission sources are primarily those permitted under the Prevention of Significant Deterioration (PSD) program. For some years those permits have been issued, in which potential emissions increases are tracked (often conditionally limited in the permit) and air quality analysis conducted as necessary. The department queried all PSD permits issued from 2020 to 2024. Only one permit was identified that resulted in major potential emission increases. The permit was to construct a new cement kiln at an existing installation in Hannibal, MO. Large potential emission increases of CO, PM_{2.5}, PM₁₀, SO₂, nitrogen oxides (NO_x), and VOCs were permitted. Details of the emission increases may be found in Table 4-1.

Table 4-1. 2020 – 2024 Missouri PSD Permits & Associated Emission Increase (Tons Per Year)

Facility Name	Description	Permit Completion Date	City	County	PM	PM ₁₀	PM _{2.5}	SO _x	NO _x	VOCs	CO	Lead
Continental Cement	New Cement Kiln	4/30/2024	Hannibal	Ralls	269.07	261.58	199.97	243.09	912.06	528.53	243.09	0.41

Ambient air quality modeling was performed to determine the ambient impact of the potential CO, PM_{2.5}, PM₁₀, SO₂, and NO₂ emission increases. The modeling analysis demonstrated that following the completion of the project, the installation's potential contribution to a NAAQS violation for these pollutants was insignificant.

There is no NAAQS for VOCs. VOCs are a regulated pollutant as they are a precursor for ozone formation. In a response to comment as a part of the permitting process, the department noted that an analysis of whether an ozone violation may occur following the project was performed and that it was expected a representative ozone monitor in Quincy, IL would continue to be below the ozone NAAQS following the completion of this project.

5.0 Carbon Monoxide Network Assessment

5.1 Introduction: Carbon Monoxide Standards and Monitoring Requirements

The primary NAAQS for CO are:

- 35 parts per million by volume (ppm) for one hour.
- 9 ppm for eight hours.

These concentrations must not be exceeded more than once per year. There is no secondary CO standard. The NAAQS are listed in the [EPA NAAQS Table](#) on the internet. The CO NAAQS were reviewed but left unchanged by a final rule published in August 2011.

In 2006, EPA issued revised air monitoring requirements (71 Federal Register 61235, Oct. 17, 2006). Unlike monitoring requirements for other pollutants, there are no required minimum numbers of CO monitoring sites in cities or metropolitan statistical areas. Because airborne CO results primarily from internal combustion engine exhaust, sites chosen for CO monitoring should be microscale or middle scale, as described in the following quotations from the monitoring regulations (71 Federal Register 61319, Oct. 17, 2006; also 40 CFR, Part 58, Appendix D, 4.2.3):

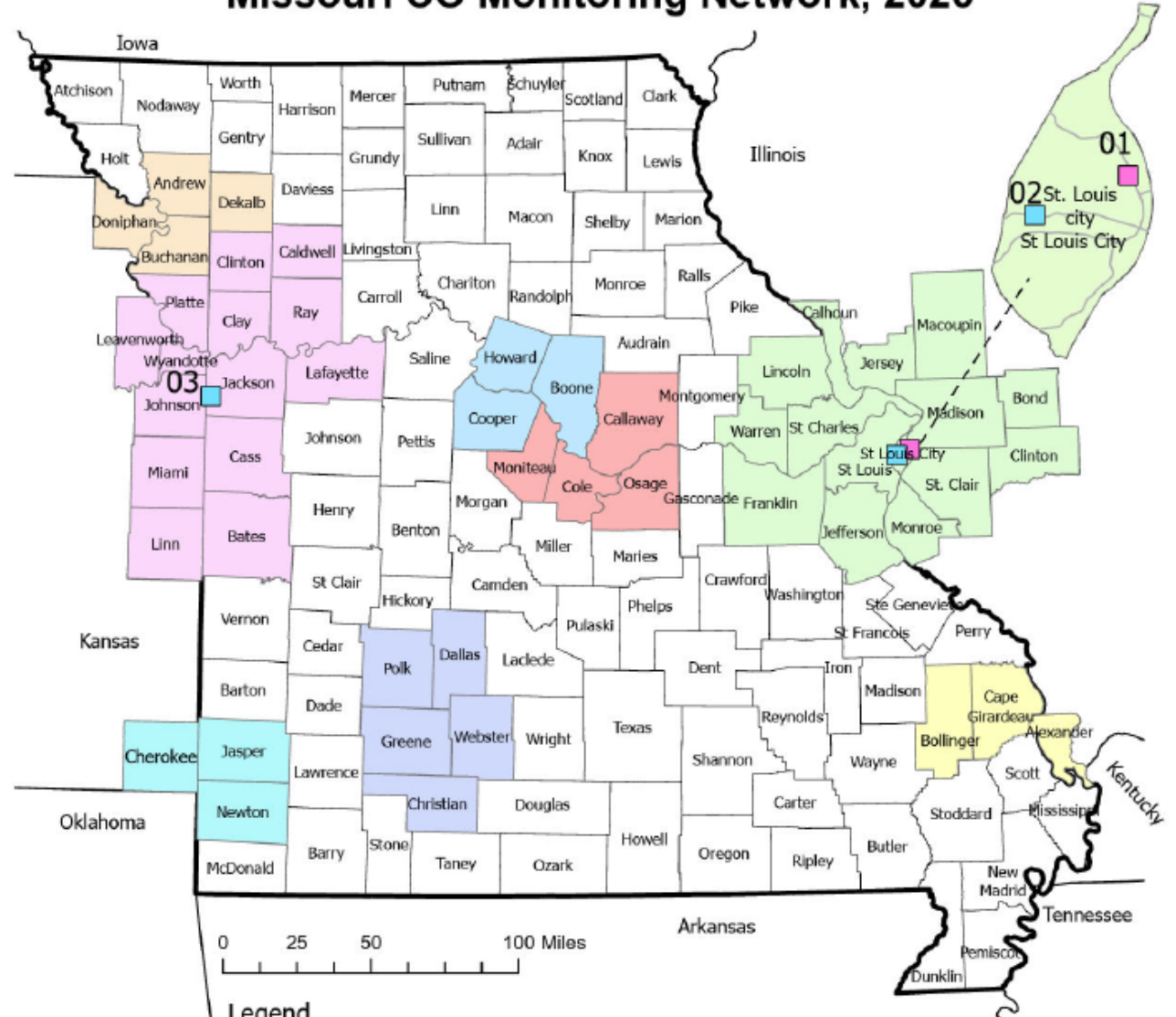
- Microscale: “Microscale measurements typically represent areas in close proximity to major roadways, within street canyons, over sidewalks, and in some cases, point and area sources. Emissions on roadways result in high ground level CO concentrations at the microscale, where concentration gradients generally exhibit a marked decrease with increasing downwind distance from major roads, or within downtown areas including urban street canyons. Emissions from stationary point and area sources, and non-road sources may, under certain plume conditions, result in high ground level concentrations at the microscale.”
- Middle Scale: “Middle scale measurements are intended to represent areas with dimensions from 100 meters to 0.5 kilometer. In certain cases, middle scale measurements may apply to areas that have a total length of several kilometers, such as “line” emission source areas. This type of emission sources areas would include air quality along a commercially developed street or shopping plaza, freeway corridors, parking lots and feeder streets.”

CO monitoring is specifically required at near-road sites (see Section 7.0) in CBSAs with a population of 1 million or larger (40 CFR, Part 58, Appendix D, 4.2.1).

5.2 CO Monitoring Results in Missouri

The locations of the current CO monitoring sites are shown on the map in Figure 5-1. Second maximum 1-hour and 8-hour average CO concentrations (design values) measured at locations in Missouri since 2018 are listed in Table 5-1 and Table 5-2 and shown in Figures 5-2 and 5-3. Design values at all of these sites were well below the NAAQS.

Missouri CO Monitoring Network, 2025



Legend

CO Monitors

- Near-Road CO Monitor
- National Core Multipollutant Monitoring (NCore) CO Monitor

MSA, Population Estimate 2024

- Cape Girardeau, MO-IL MSA, 98,862
- St. Joseph, MO-KS MSA, 119,124
- Jefferson City, MO MSA, 151,523
- Joplin, MO-KS MSA, 207,131
- Columbia, MO MSA, 219,426
- Springfield, MO MSA, 496,975
- Kansas City, MO-KS MSA, 2,253,579
- St. Louis, MO-IL MSA, 2,811,927

St. Louis, MO-IL MSA

01 Blair Street

02 Forest Park, I-64

Kansas City, MO-KS MSA

03 Linden Hills, I-435



Figure 5-1. Missouri CO Monitoring Network, 2025
Table 5-1

Carbon Monoxide Design Values, ppm (Highest second maximum over two-years, non-overlapping 1-hour average)^{1,2}					
Yellow Highlights Indicate Design Values Exceeded the 1971 Standard (35 ppm)					
Site Name	18-19	19-20	20-21	21-22	22-23
Blair Street	2.5	2.5	2.3	1.7	2.1
Blue Ridge, I-70	1.9	1.6	1.6	1.9	1.9
Forest Park	1.6	1.6	1.5	1.2	1.5
Linden Hills					
¹ Blue Ridge, I-70 was Discontinued in 2023 Due to Vandalism.					
² Linden Hills was Added in 2025 as Near Road Site to Replace Blue Ridge, I-70.					

Table 5-2

Carbon Monoxide Design Values, ppm (Highest second maximum over two-years, non-overlapping 8-hour average)^{1,2}					
Yellow Highlights Indicate Design Values Exceeded the 1971 Standard (9 ppm)					
Site Name	18-19	19-20	20-21	21-22	22-23
Blair Street	2.5	2.5	2.3	1.7	2.1
Blue Ridge, I-70	1.9	1.6	1.6	1.9	1.9
Forest Park	1.6	1.6	1.5	1.2	1.5
Linden Hills					
¹ Blue Ridge, I-70 was Discontinued in 2023 Due to Vandalism.					
² Linden Hills was Added in 2025 as Near Road Site to Replace Blue Ridge, I-70.					

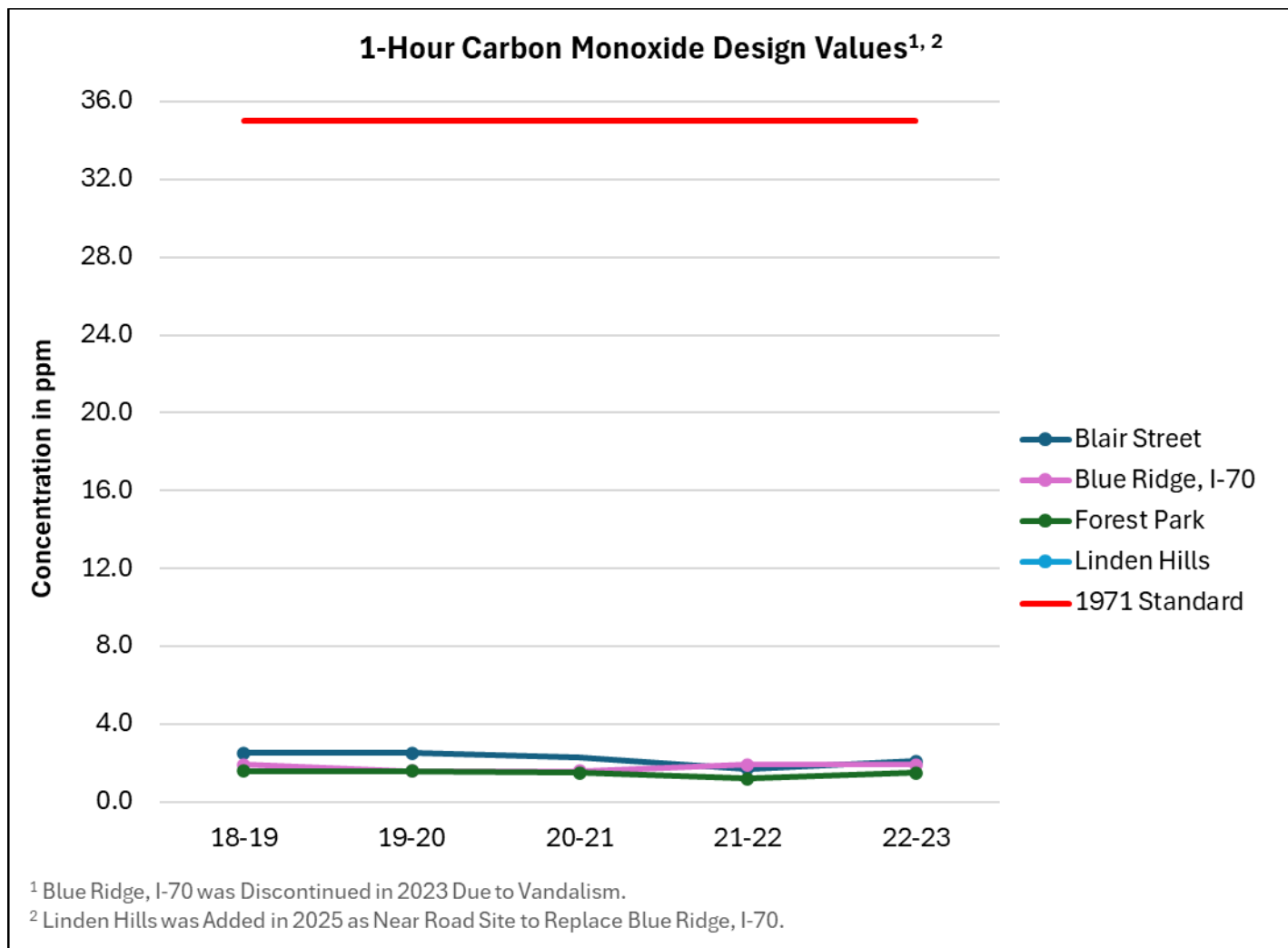


Figure 5-2. Carbon Monoxide 1-hour Design Values

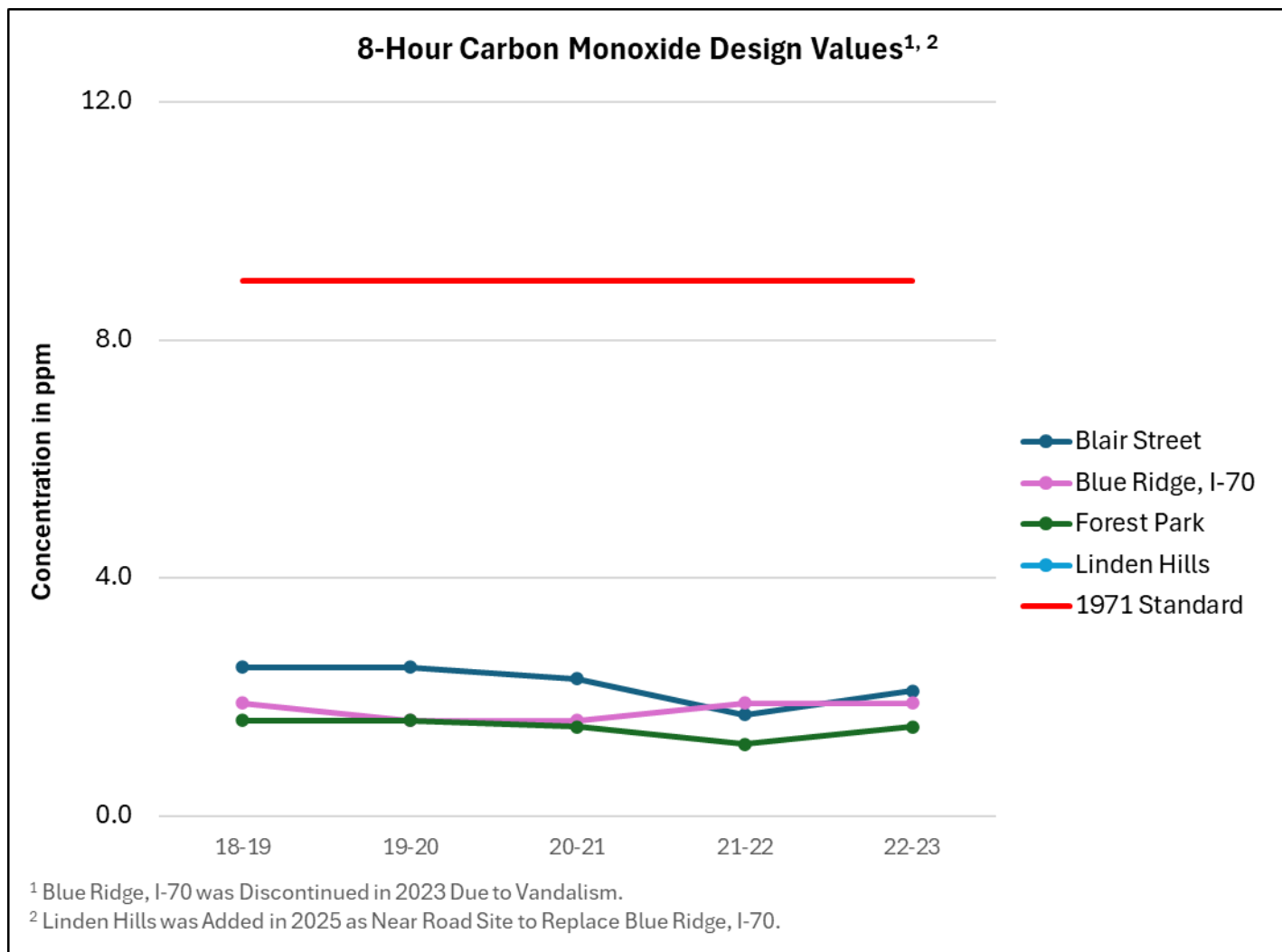


Figure 5-3. Carbon Monoxide 8-hour Design Values

5.3 CO Emissions

CO emissions occur primarily from internal combustion engines. The majority of such emissions are from motor vehicles. Point and area (non-mobile) sources of CO are not as significant as mobile sources. Details of point, area (non-mobile), and mobile source CO emissions by county may be found in Figure 5-4, 5-5, and 5-6, respectively.

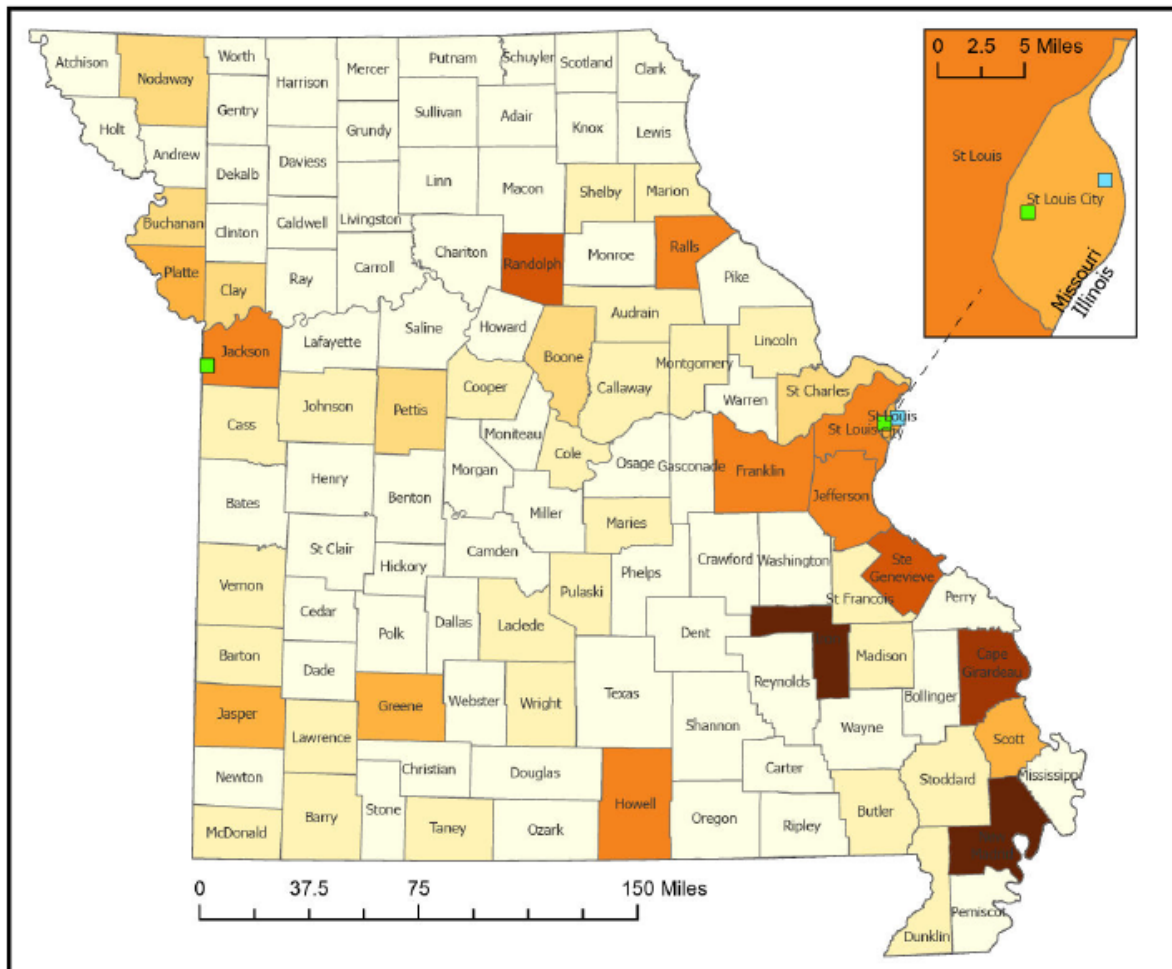
Figures 5-7 and 5-8 show portions of Missouri Department of Transportation maps with numbers indicating annual average daily traffic on major roadways in the St. Louis and Kansas City areas. A more recent interactive [Missouri traffic volume map](#) with color coding for ranges of traffic volume and traffic volume data available by clicking on a road segment is available online.

Two near-roadway NO₂ monitoring sites are required in the St. Louis area and one site in the Kansas City area (40 CFR 58 Appendix D). CO monitoring is required at one of the near-roadway sites in each area. The locations of the near-roadway sites were selected based on their proximity to highway segments with high traffic counts, on their suitability in meeting siting criteria (40 CFR 58 Appendix E), and on logistical considerations. The site selection process was described in detail in past Monitoring Network Plans.

The Linden Hills near-roadway site in Kansas City was established in 2025 to replace the Blue Ridge I-70 site as the Kansas City area near-roadway site, which was discontinued due to site security issues. Selection of the Linden Hills site was based on an analysis in 2023 that included review of traffic volumes. Traffic counts from the maps in Figure 5-8 were used as a starting point to determine which road segments should be further analyzed using the more recent traffic volume data available on the above-mentioned interactive map. Candidate sites were then evaluated based on siting criteria and logistical considerations.

Candidate St. Louis area near-roadway sites were originally identified using 2010 traffic counts from a map similar to the one shown in Figure 5-7. The two sites (Forest Park and Rider Trail I-70) were then selected based on suitability in meeting siting criteria and logistical considerations. Traffic counts from 2024 for the two sites remain at relatively high levels. The 2024 traffic count at Forest Park is 92% of the 2010 count, and the 2024 traffic count at Rider Trail I-70 is 105% of the 2010 count. Therefore, these two sites continue to be suitable for near-roadway monitoring.

Missouri Carbon Monoxide (CO) Point Source Emissions



Legend

- Near-Road CO Monitor
- National Core Multipollutant Monitoring (NCore) CO Monitor

2020 CO Point Source Emissions (tpy)

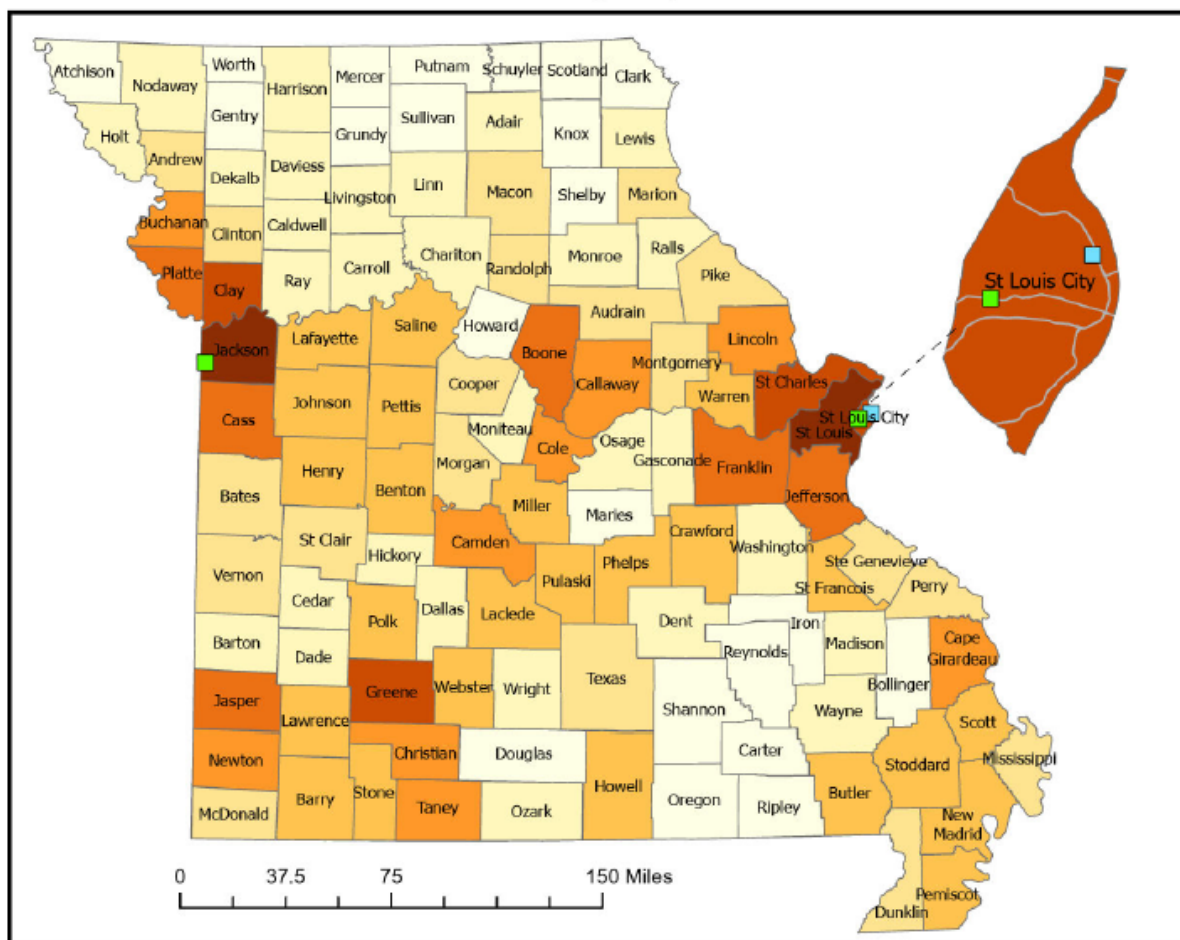
Carbon Monoxide

- 0.00 - 60.00
- 60.00 - 244.50
- 244.50 - 673.00
- 673.00 - 1167.90
- 1167.90 - 2399.20
- 2399.20 - 5949.70
- 5949.70 - 9610.80
- 9610.80 - 18017.60



Figure 5-4. Missouri Statewide Point Source CO Emissions and 2025 CO Monitoring Network

Missouri Carbon Monoxide (CO) Mobile Source Emissions



Legend

- Near-Road CO Monitor
- National Core Multipollutant Monitoring (NCore) CO Monitor

2020 CO Mobile Source Emissions (tpy)

Carbon Monoxide

- 269.30 - 1324.40
- 1324.40 - 2198.90
- 2198.90 - 3435.30
- 3435.30 - 5245.60
- 5245.60 - 7973.80
- 7973.80 - 16811.40
- 16811.40 - 28118.80
- 28118.80 - 105560.90



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NATURAL RESOURCES



Figure 5-6. Missouri Statewide Mobile Source CO Emissions and 2025 CO Monitoring Network



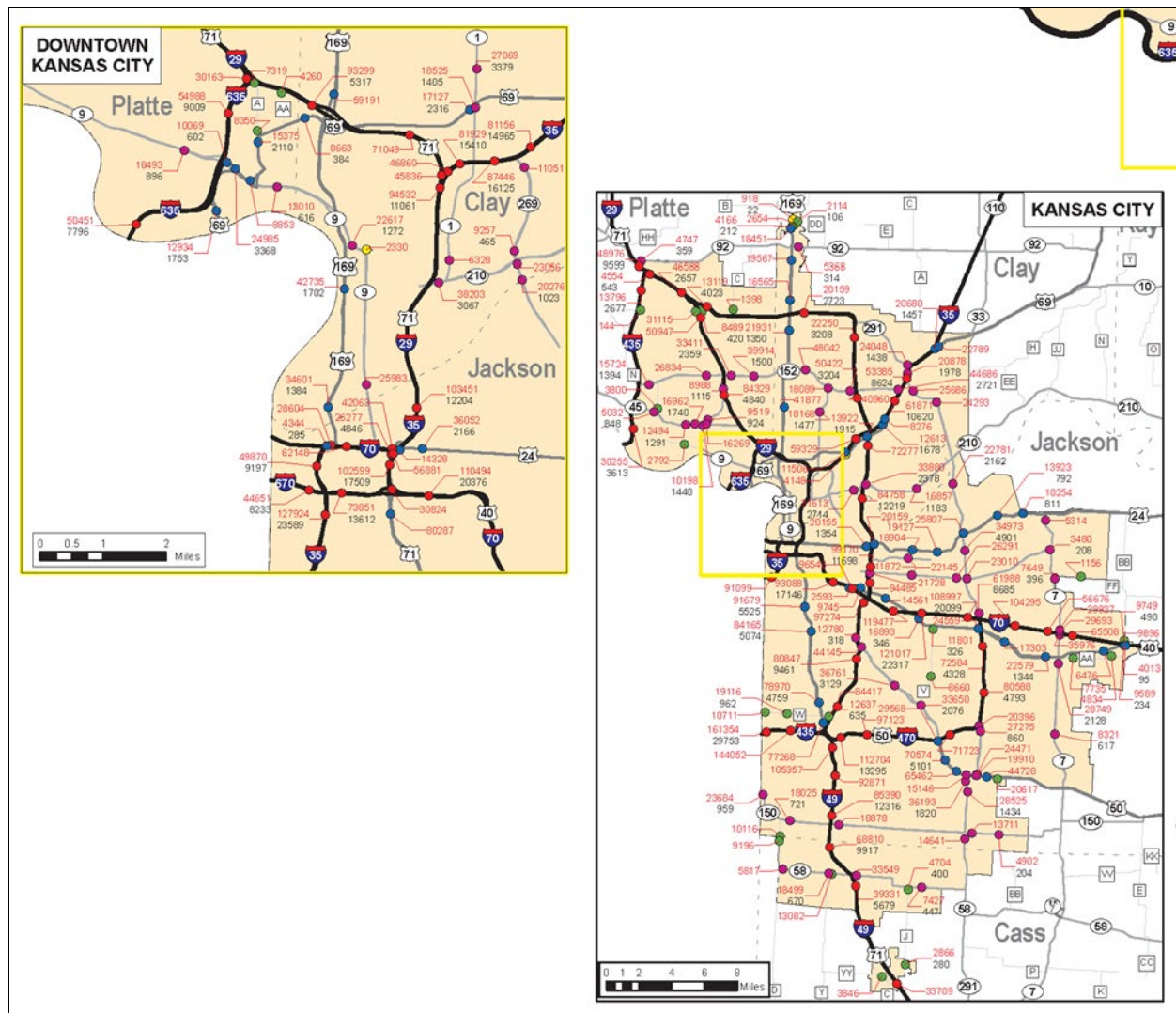


Figure 5-8. Kansas City Area Annual Average Daily Traffic (AADT; in red) and Truck Traffic (in black), 2016, from [MoDOT Archived Traffic Volume Maps](#)

5.4 Evaluation of the CO Monitoring Network

CO emissions are primarily from motor vehicle exhaust, and CO monitoring sites should be either microscale, representing street canyons, or middle scale, representing areas including longer roadways or large parking areas. As shown in Table 5-1 and Figures 5-1 and 5-2, CO design values in 2020 through 2024 at all sites remained well below the standards. However, CO monitoring at the three remaining sites is critical, because the Blair Street site is an NCore site, and the other two sites are required near-roadway sites.

6.0 Sulfur Dioxide Network Assessment

6.1 Introduction: Sulfur Dioxide Standards and Monitoring Requirements

The current primary National Ambient Air Quality Standards (NAAQS) for sulfur dioxide (SO₂) is 75 ppb. The form of the standard is the 3-year average of the 99th percentile of annual daily maximum 1-hour averages. The secondary NAAQS is 10 ppb averaged over three years. The NAAQS are listed in the [EPA NAAQS Table](#) on the internet. The primary SO₂ NAAQS was reviewed, but left unchanged by a final rule published in March 2019. The secondary SO₂ NAAQS was reviewed and changed in a final rule published in December 2024. The secondary SO₂ NAAQS was a 0.5 ppm, 3-hour average, not to be exceeded more than once per year prior to the revision.

Minimum monitoring requirements are based on a combination of population and SO₂ emissions in Core Based Statistical Areas (CBSAs; 40 CFR Part 58, Appendix D). For each CBSA, population weighted emission index (PWEI) is calculated by multiplying the population of each CBSA by the total amount of SO₂ in tons per year emitted within the CBSA area based on National Emissions Inventory data. The resulting is then divided by 1 million, so that the units of the PWEI are million persons-tons per year. For any CBSA with a calculated PWEI value equal to or greater than 1 million, a minimum of three SO₂ monitors is required. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1 million, a minimum of two SO₂ monitors is required. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO₂ monitor is required.

Table 6-1 lists the results of the PWEI calculation for CBSAs that are in whole or in part in Missouri using 2024 population estimates and 2020 NEI emissions data. Based on these results, two SO₂ monitors are required in the St. Louis CBSA and one is required in the Kansas City CBSA. In addition to these requirements, each NCore site must include a trace-level SO₂ analyzer.

In May 2014, EPA published proposed data requirements regulations related to SO₂ air quality monitoring and air quality dispersion modeling near emission sources. These requirements were finalized in the SO₂ Data Requirements Rule (DRR) published in the Federal Register on Aug. 21, 2015. This final rule requires that air agencies must characterize air quality, either by monitoring or modeling, around sources that emit 2,000 tons per year (tpy) or more of SO₂. On Jan. 15, 2016, the department submitted a final list, [available on the internet](#), identifying the sources in the state around which SO₂ air quality will be characterized. The Ameren Labadie Energy Center and the former Noranda Aluminum, now known as Magnitude 7 Metals, facility were included on that list. The Doe Run Buick Resource Recycling Facility reported emissions less than 2,000 tpy, but was also included on the list because emissions from that facility were uncertain and under review at the time of the January 2016 submittal.

The Ameren Rush Island Energy Center was not included in the DRR list, because it is within a previously-designated nonattainment area (designated as nonattainment due to emissions from another facility). Monitoring in the area around Rush Island was being conducted by agreement between the department and Ameren associated with the plan for the Jefferson County nonattainment area submitted to EPA in December 2017. In accordance with the agreement, Ameren submitted a

formal request to the department to shut down the SO₂ monitors and the associated meteorological equipment around Rush Island down. The department agreed to the request, since the Rush Island installation is permanently prohibited from burning coal in the future, and even when the installation was burning coal, measured SO₂ concentrations were far below the primary SO₂ standard. The department is actively working on a revision to the State Implementation Plan to account for this change.

For each facility listed in the January 2016 submittal, the state was required to identify by July 1, 2016, the approach (ambient monitoring or air quality modeling) that would be used to characterize air quality or identify sources whose emissions will be limited to less than 2,000 tpy by an enforceable agreement. For source areas that were to be evaluated through ambient monitoring, the air agency was required to submit information on monitoring sites to EPA by July 1, 2016, as part of its annual monitoring network plan. This SO₂ monitoring to meet the DRR was required to begin by Jan. 1, 2017. Monitoring near the Ameren Labadie Energy Center, the Magnitude 7 Metals facility and the Buick Resource Recycling Facility began in January 2017 and is continuing. To meet the requirements of the DRR, these monitors will need a minimum of three years of monitoring data. The sources cannot discontinue monitoring thereafter without EPA approval based on the requirements of 40 CFR 51.1203(c)(3) or 40 CFR 58.14. This monitoring is being conducted by the industries operating the sources, but the monitoring must be conducted in accordance with the SLAMS requirements in 40 CFR Part 58, and the department reviewed and approved the siting of the monitors based on federal regulations and oversees the operation of the monitors.

In May 2018, the department's Air Pollution Control Program submitted a clean data determination request to EPA for the Jackson County nonattainment area where the Troost monitoring station is located based on SO₂ ambient monitoring data from 2015 to 2017. In November 2018, EPA responded requesting Missouri to submit modeling information showing the entire area was attaining the NAAQS. The air program developed and submitted the modeling demonstration to EPA in March 2019, with revisions to the demonstration based on EPA feedback submitted in June 2019. EPA proposed the clean data determination for the area in July 2020. The air program submitted a maintenance plan and redesignation request for the Jackson County SO₂ nonattainment area to EPA in February 2021 and a maintenance plan supplement in September 2021. The EPA approved the redesignation request and associated maintenance plan in January 2022.

In September 2017, EPA published in the Federal Register a clean data determination for the Jefferson County nonattainment area where the Mott Street site is located. In December 2017, the air program submitted Missouri's redesignation request and maintenance plan for the Jefferson County nonattainment area to EPA. Based on EPA's Clean Data Policy, the air program withdrew from EPA consideration the Jefferson County nonattainment area plan. The air program developed a supplemental demonstration to further support the maintenance plan and redesignation request and submitted it to EPA in February 2019. This supplemental demonstration followed EPA's guidelines on air quality models from 40 CFR 51 Appendix W and showed the enforceable requirements on sources in the area are sufficient to maintain the 2010 SO₂ NAAQS throughout the maintenance period. EPA approved the redesignation request and associated maintenance plan in January 2022.

EPA completed "Round 3" designations by the court-ordered deadline of Dec. 31, 2017. EPA designated all remaining undesignated counties in Missouri, except for Iron and New Madrid

counties, as attainment/unclassifiable. This includes a portion of St. Louis County, and the counties of Barton, Jasper, Henry, Greene and Randolph.

“Round 4” designations refer to areas where monitoring is conducted under the Data Requirements Rule, the areas near the Labadie, Buick, and Magnitude 7 facilities.

Only one area in the state, near the Magnitude 7 Metals facility and the nearby New Madrid Power Plant, exceeded the NAAQS and continues to exceed the NAAQS. The area near the Buick facility was monitoring compliance based on 2017 to 2019 data and continues to monitor compliance with the NAAQS as of the 2021 to 2023 design value period. The air program submitted area boundary designation recommendations to EPA using 2017 to 2019 monitoring data from the monitoring stations near Buick and Magnitude 7 in April 2020. The recommendations were nonattainment and attainment/unclassifiable, respectively. EPA approved the recommendations and finalized them in March 2021.

Since Labadie was a named source in a court settlement, the area surrounding that source had already been designated as unclassifiable. The four monitors installed around the Ameren Labadie plant all monitor compliance with the 2010 SO₂ NAAQS based on 2017 to 2019 preliminary monitoring data. The air program submitted a redesignation request from unclassifiable to attainment/unclassifiable based on the data from the monitors around Labadie in September 2020. The department submitted a nonattainment area plan to EPA for New Madrid County in May 2023. The plan is currently under review by EPA.

Table 6-1 Population Weighted Emission Index (PWEI) Summary				
CBSA	Estimated 2024 Population	2020 NEI SO ₂ Emissions (tpy)	PWEI	Required Number of SO ₂ Monitors
St. Louis	2,811,927	62,707.68	176,329	2
Kansas City	2,253,579	5,073.41	11,433	1
Springfield	496,975	2,468.12	1,227	0
Moberly	24,077	13,743.06	331	0
Sikeston	49,707	4,298.53	214	0
Columbia	219,426	522.33	115	0
Joplin	207,131	285.07	59	0
Farmington	67,503	624.97	42	0
Jefferson City	151,523	258.05	39	0
Quincy	73,961	466.25	34	0
Cape Girardeau	98,862	339.62	34	0
St. Joseph	119,124	269.63	32	0
Hannibal	38,924	742.77	29	0
West Plains	40,762	321.08	13	0
Branson	56,744	227.13	13	0
Rolla	45,672	154.51	7	0
Poplar Bluff	41,814	120.65	5	0
Lebanon	36,738	129.83	5	0
Fort Leonard Wood	53,964	86.55	5	0
Kirksville	29,729	107.89	3	0
Sedalia	43,791	55.54	2	0
Warrensburg	55,880	43.02	2	0
Mexico	24,304	30.55	1	0
Maryville	20,503	31.36	1	0
Kennett	27,002	20.58	1	0
Marshall	23,325	20.10	0	0
PWEI=population*SO ₂ (tpy)/1,000,000 PWEI > 1,000,000: 3 monitors 1,000,000 > PWEI > 100,000: 2 monitors 100,000 > PWEI > 5,000: 1 monitor Population estimates from https://www.census.gov/data/tables/time-series/demo/popest/2020s-counties-total.html SO ₂ emissions from 2020 NEI including fire emissions				

6.2 SO₂ Monitoring Results in Missouri

The current SO₂ monitoring network is shown on the map in Figure 6-1. Table 6-2 and Figure 6-2 show the SO₂ design values measured at Missouri sites in recent years. The three sites near the Magnitude 7 Metals facility exceeded the NAAQS for the most recent 3-year period, 2021-2023. The department and Magnitude 7 Metals came to an agreement on ways to reduce, better characterize, and better disperse SO₂ emissions in 2023. Magnitude 7 Metals idled the facility in early 2024.

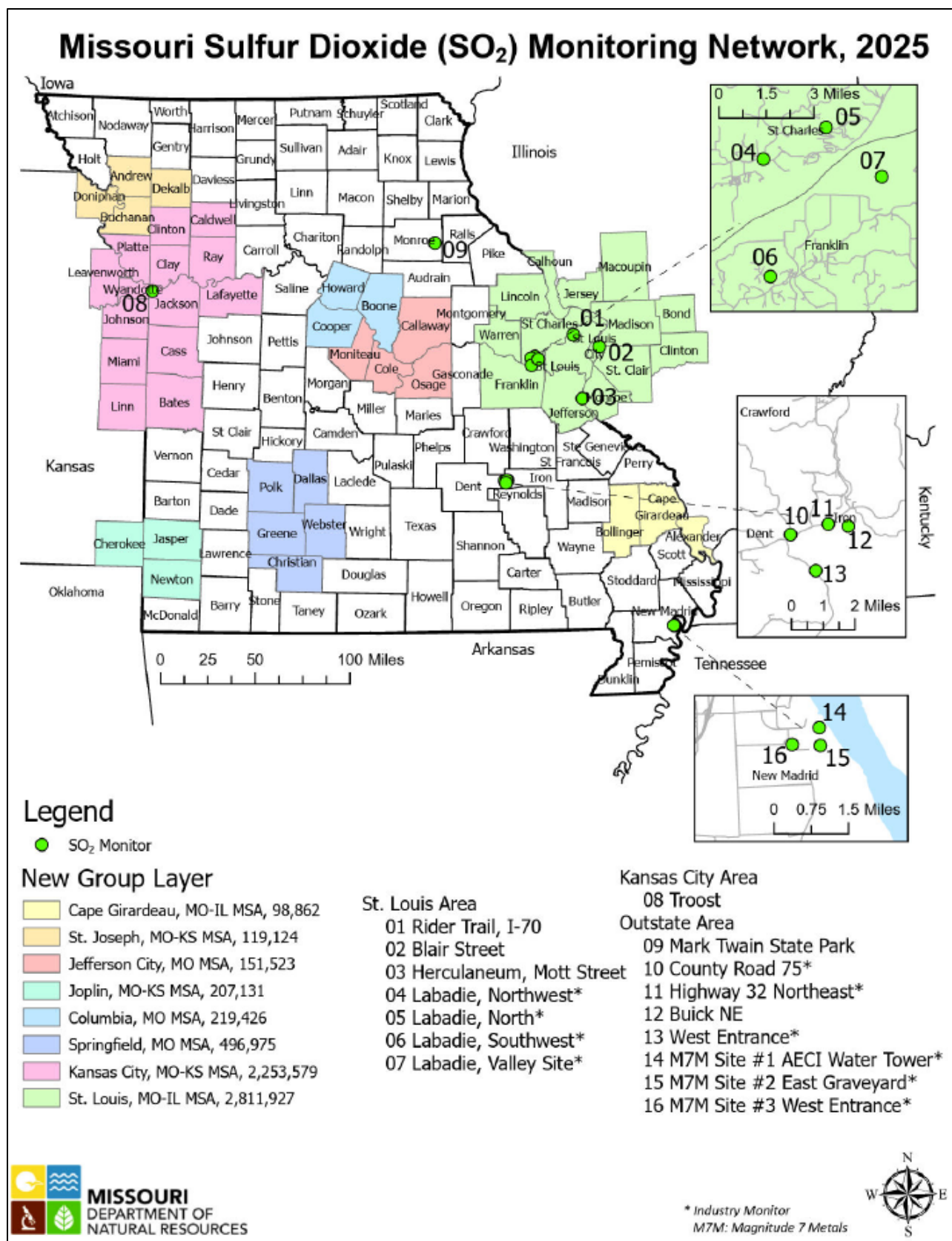


Figure 6-1. Missouri SO₂ Monitoring Network, 2025

Table 6-2

SO2 Design Values, ppb (Annual 99th percentile daily max 1-hour concentrations, averaged over three consecutive years)

Yellow Highlights Indicate Design Values Exceeded the Standard (75ppb)

State of Missouri Operated Sites

Site Name	17-19	18-20	19-21	20-22	21-23
Blair Street	10	9	10	11	13
Buick Northeast	48	47	44	44	50
Herculaneum, Mott Street	14	14	14	15	12
Mark Twain State Park	4	5	5	5	4
Rider Trail	14	12	15	18	19
Troost	10	7	6	6	6

Industry Operated Sites

Site Name	17-19	18-20	19-21	20-22	21-23
Ameren Labadie, Northwest	19	22	22	29	30
Ameren Labadie, Northwest	29	29	29	29	33
Ameren Labadie, Southwest	24	28	30	35	32
Ameren Labadie, Valley				34	37
Ameren Rush Island, Fults				15	13
Ameren Rush Island, Natchez	21	21	22	20	15
Ameren Rush Island, Weaver-AA				25	20
Doe Run, Buick Northeast	50	47	46	42	42
Doe Run, County Road 75	39	36	38	46	47
Doe Run, West Entrance	42	44	45	41	39
Magnitude 7 Metals Site #1	202	320	376	417	452
Magnitude 7 Metals Site #2	268	361	333	291	291
Magnitude 7 Metals Site #3	47	68	83	95	115

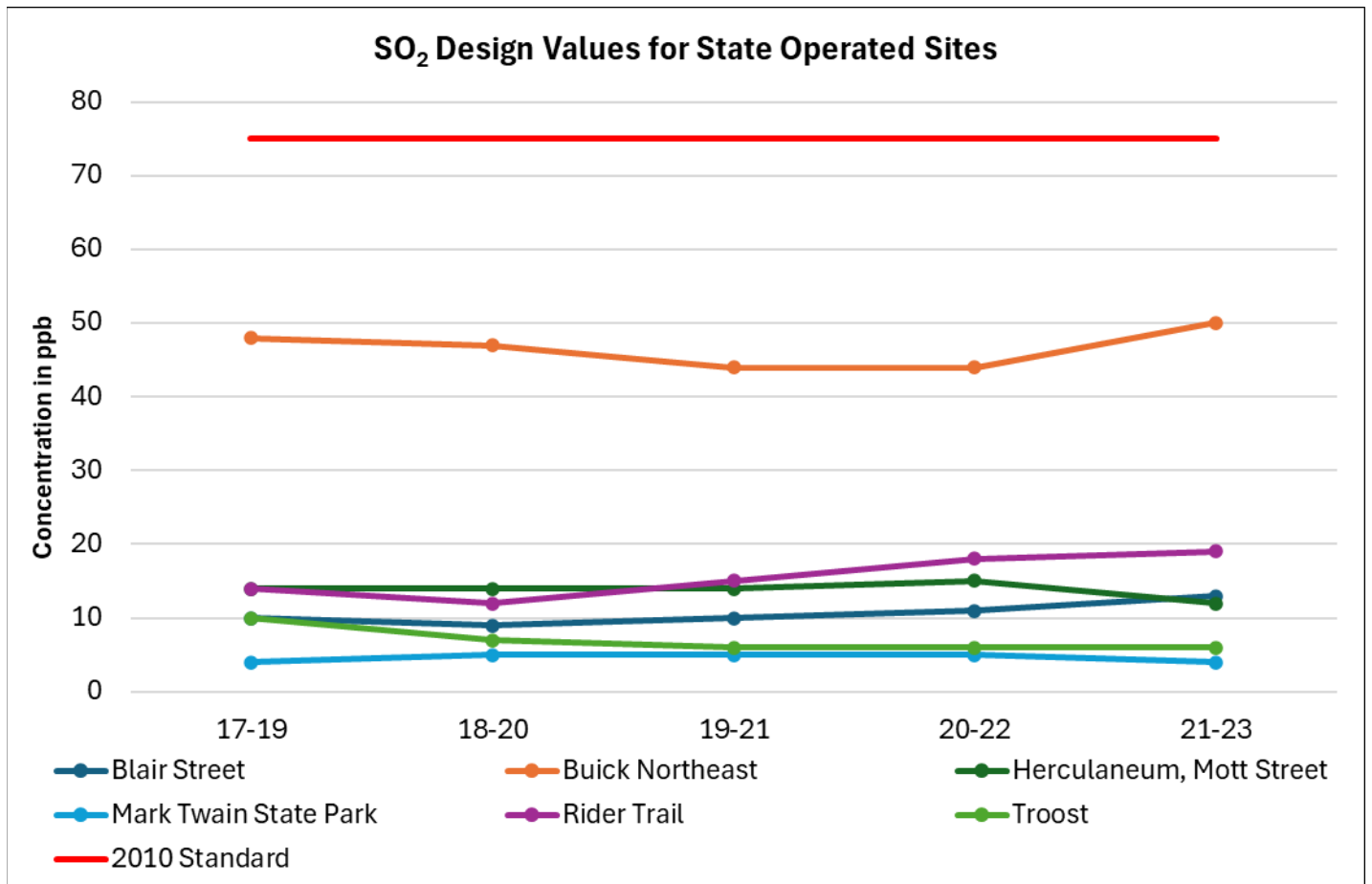


Figure 6-2a. Sulfur Dioxide Design Values, State Operated Sites

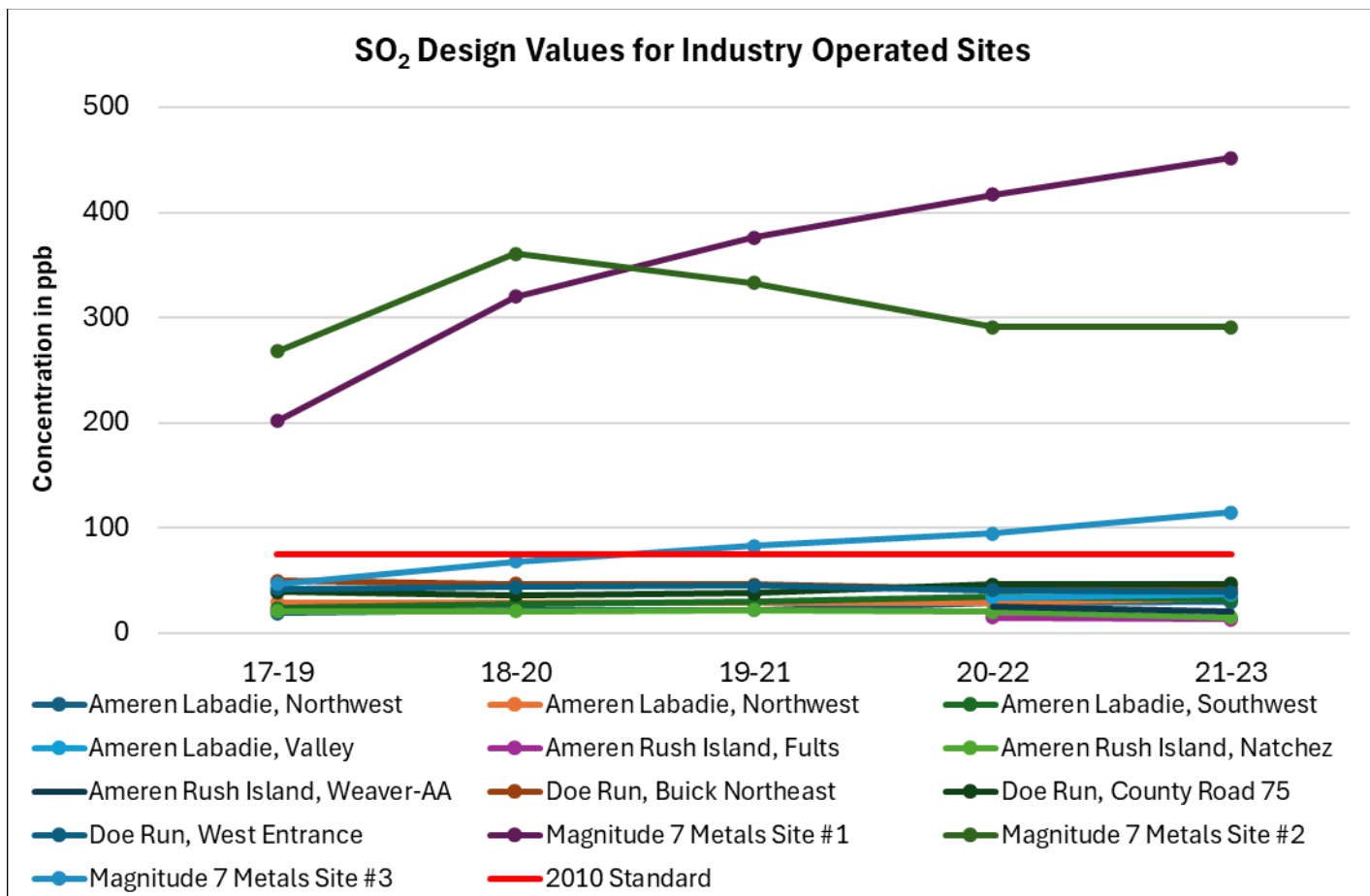
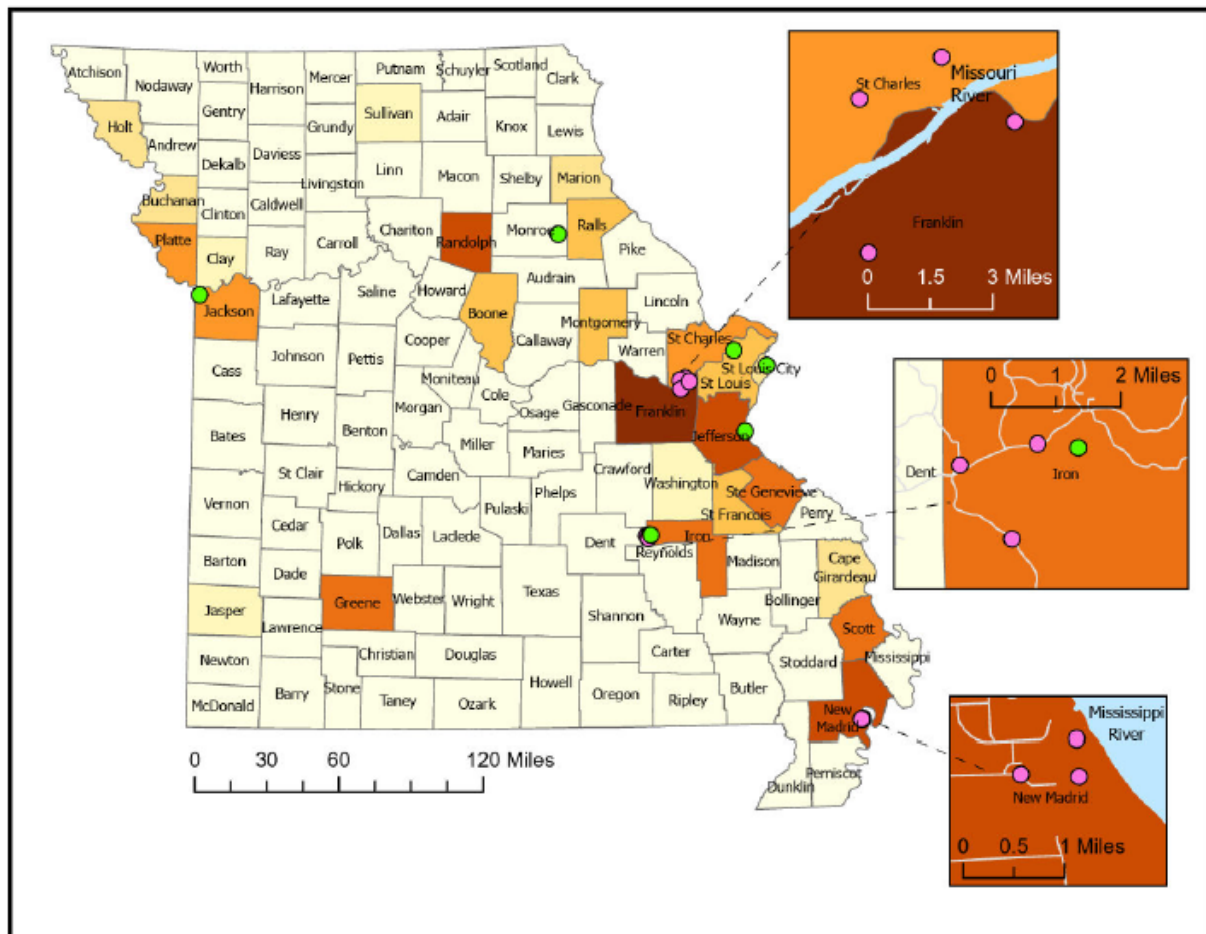


Figure 6-2b. Sulfur Dioxide Design Values, Industrial Sites

6.3 SO₂ Emissions

Per data from the 2020 NEI, electricity generation via combustion from point sources makes up around 80% of the SO₂ emissions in Missouri (point and area sources). Details of point, area (non-mobile), and mobile source SO₂ emissions by county may be found in Figure 6-3, 6-4, and 6-5, respectively.

Missouri Sulfur Dioxide (SO₂) Point Source Emissions



Legend

- State Monitor
- Industry Monitor

2020 SO₂ Point Source Emissions (tpy)

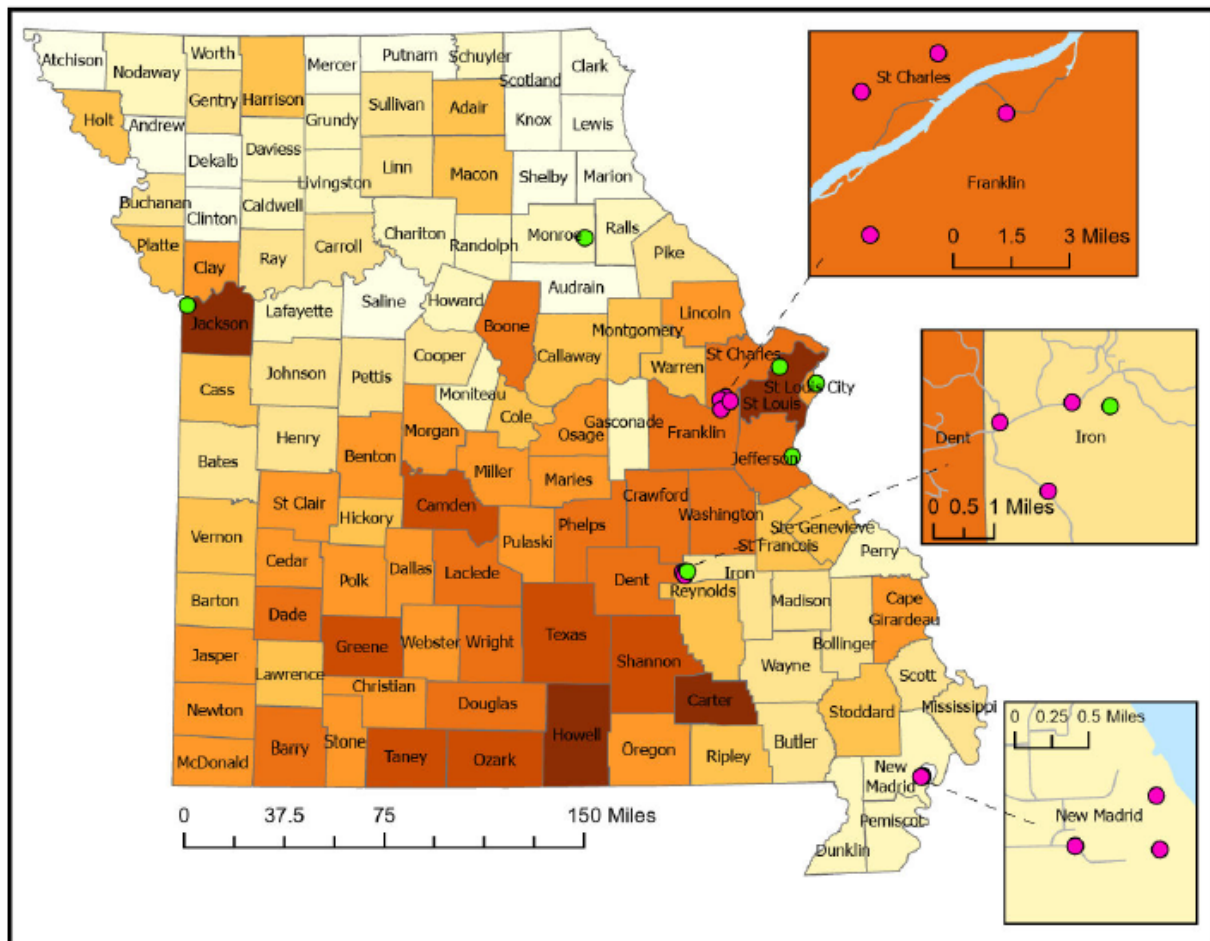
Sulfur Dioxide

- 0.00 - 21.20
- 21.20 - 88.80
- 88.80 - 196.20
- 196.20 - 565.00
- 565.00 - 1362.60
- 1362.60 - 4270.70
- 4270.70 - 17820.00
- 17820.00 - 39392.20



Figure 6-3. 2020 Statewide SO₂ Point Source Emissions and the 2025 Monitoring Network

Missouri Sulfur Dioxide (SO₂) Area Source Emissions



Legend

- State Monitor
- Industry Monitor

2020 SO₂ Area Source Emissions (tpy)

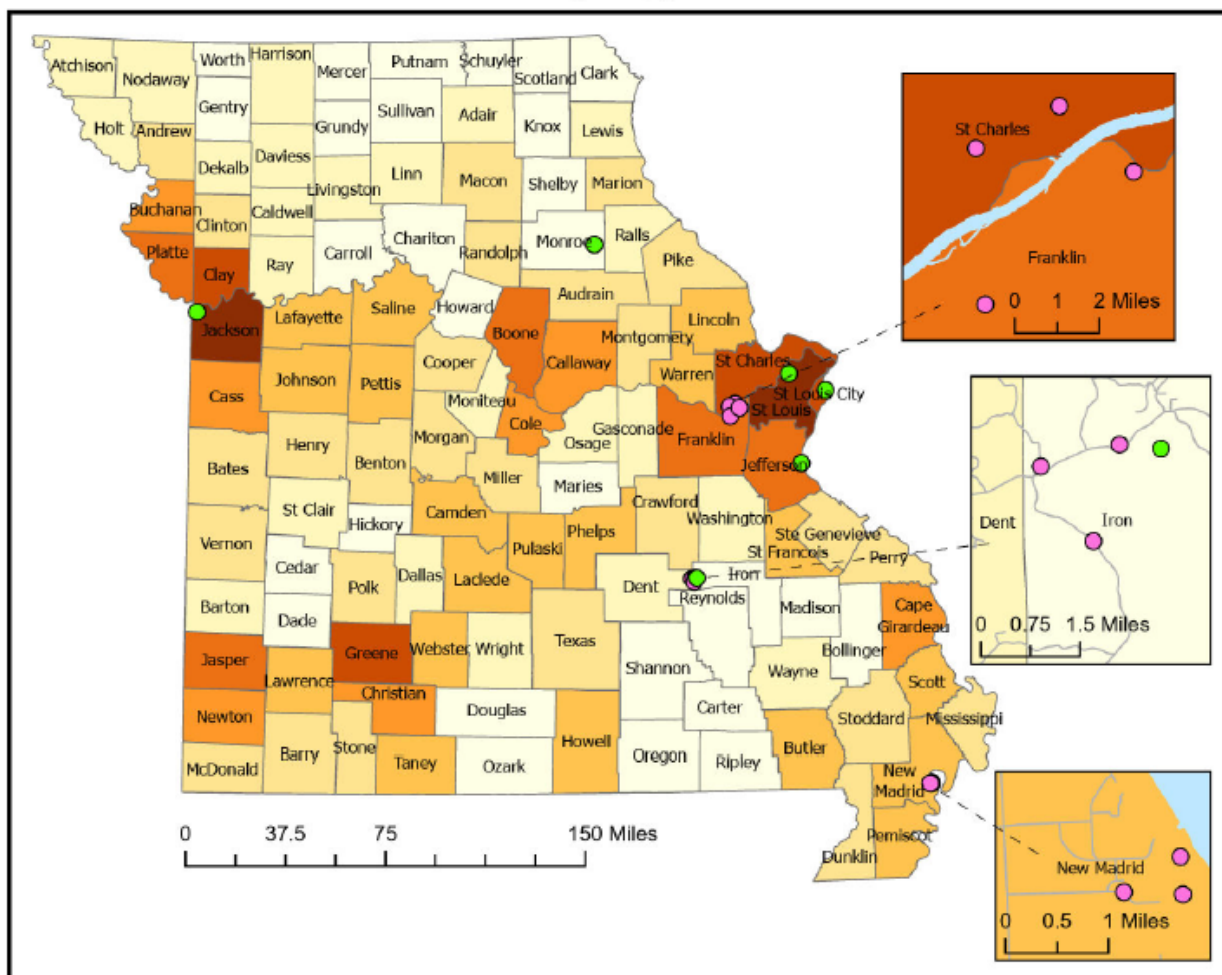
Sulfur Dioxide

- 4.50 - 11.70
- 11.70 - 19.10
- 19.10 - 28.20
- 28.20 - 40.90
- 40.90 - 59.80
- 59.80 - 86.70
- 86.70 - 134.60
- 134.600001 - 192.100000



Figure 6-4. 2020 Statewide SO₂ Area Source Emissions and the 2025 Monitoring Network

Missouri Sulfur Dioxide (SO₂) Mobile Source Emissions



Legend

- State Monitor
- Industry Monitor

2020 SO₂ Mobile Source Emissions (tpy)

Sulfur Dioxide

- 0.10 - 0.50
- 0.50 - 0.90
- 0.90 - 1.60
- 1.60 - 2.50
- 2.50 - 4.00
- 4.00 - 7.80
- 7.80 - 13.90
- 13.90 - 39.50



Figure 6-5. 2020 Statewide SO₂ Mobile Source Emissions and the 2025 Monitoring Network

6.4 Evaluation of the SO₂ Monitoring Network

The Troost site is critical because it is the only SO₂ monitoring site in Kansas City, Missouri (the other Kansas City area SO₂ monitor is in Kansas), and it is also required as a part of the maintenance plan for the Jackson County area. The Buick NE site is critical because it is source oriented.

The NCore site at Blair Street in St. Louis is also judged to be critical because of the requirement for trace-level SO₂ measurement at all NCore sites and because of the PWEI requirement for two sites in the St. Louis area. The Mott Street site is also judged to be critical because a second St. Louis area site is necessary to meet the PWEI requirement. Further, the Mott Street site is critical in order to continue to assess the former Jefferson County nonattainment area continues to meet the SO₂ NAAQS. The Mark Twain State Park site is judged to be credible to critical because it meets the need for measurement of regional background SO₂ concentration.

SO₂ monitoring at the Rider Trail I-70 site, designated as special purpose monitoring, began in 2016 to evaluate SO₂ levels in the general area, in which there are several potential emission sources. Continued operation of this site is judged to be credible in order to continue to evaluate population exposure to SO₂ in the area.

Continued operation of the Labadie, Magnitude 7 Metals, and Doe Run Buick industrial sites is critical at least in the near term, because of their source-orientation, and because these sites may not be discontinued without EPA approval.

7.0 Nitrogen Dioxide Network Assessment

7.1 Introduction: Nitrogen Dioxide Standards and Monitoring Requirements

The current primary National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO₂) is 100 ppb. The form of the standard is the 3-year average of the 98th percentile of annual daily maximum 1-hour averages. There is also a primary and secondary NAAQS set at an annual average of 53 ppb. The NAAQS are listed in the [EPA NAAQS Table](#) on the internet.

Minimum NO₂ monitoring requirements (40 CFR Part 58, Appendix D) include:

1. Near-road: At least one monitor near a major road in any CBSA with population greater than or equal to 1 million people. A second monitor near a major road in CBSAs with either population greater than or equal to 2.5 million or one or more segments with an annual daily traffic count greater than or equal to 250,000 vehicles.
2. Community-wide: A minimum of one monitor in any CBSA with population greater than or equal to 1 million people to monitor a location of expected highest NO₂ concentrations representing the neighborhood or larger spatial scales.
3. Susceptible and vulnerable communities: 40 additional NO₂ monitors to be sited nationally by the EPA Regional Administrators with states' assistance.

7.2 NO₂ Monitoring Results in Missouri

The current NO₂ monitoring network is shown on the map in Figure 7-1. Table 7-1 and Figure 7-2 show the NO₂ one-hour design values measured at Missouri sites in recent years. Table 7-2 and Figure 7-3 show the NO₂ annual design values. Both one-hour and annual design values are well below the NAAQS at all sites.

Missouri Nitrogen Dioxide (NO₂) Monitoring Network, 2025

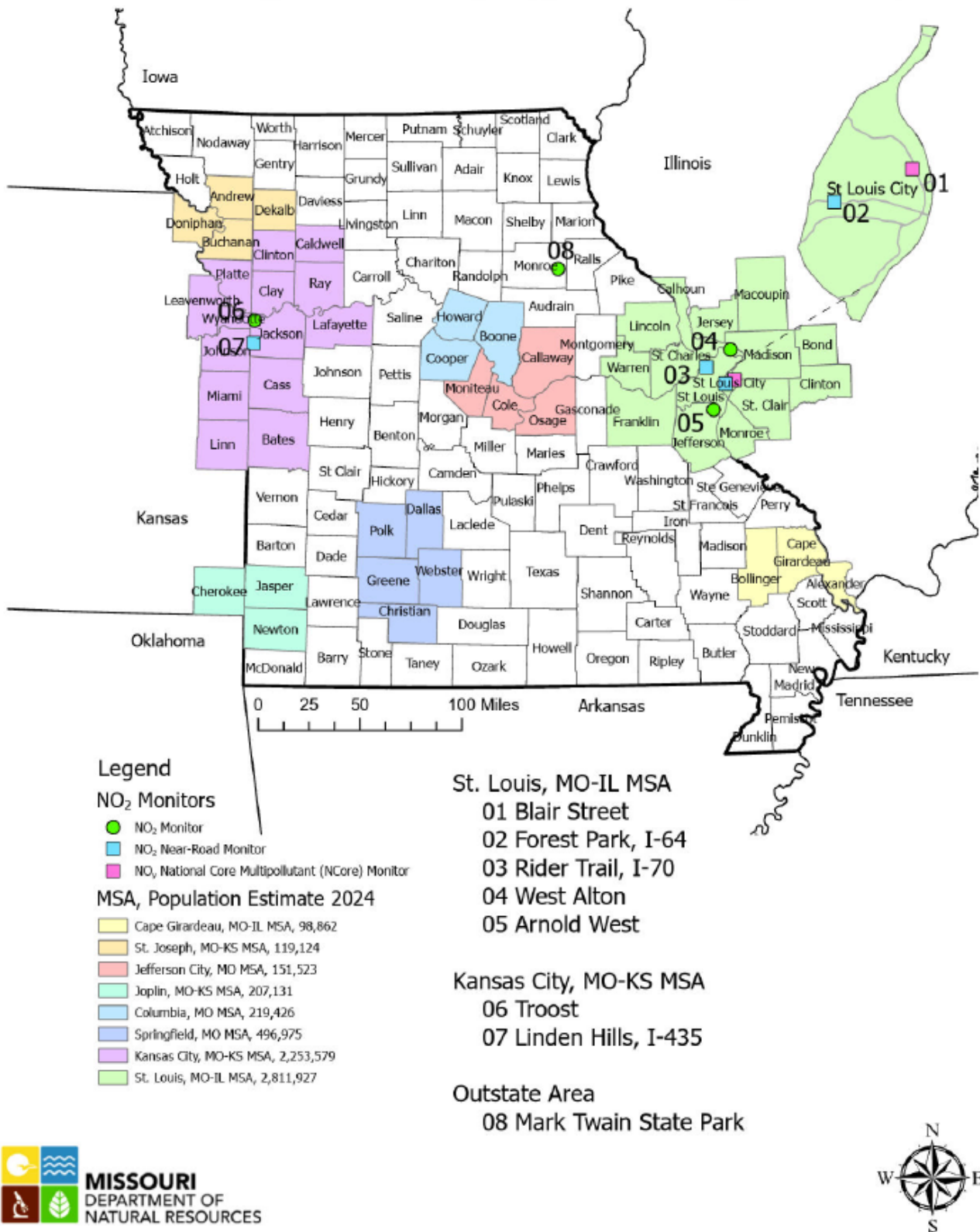


Figure 7-1. Statewide NO₂ Monitoring Network, 2025
Table 7-1

Nitrogen Dioxide Design Values, ppb (Annual 98th percentile of the daily max 1-hour concentrations, averaged over three consecutive years) ^{1,2,3}					
Yellow Highlights Indicate Design Values Exceeded the 2010 Standard (100 ppb)					
Site Name	18-19	19-20	20-21	21-22	22-23
Arnold West					
Blair Street	46	44	44	44	46
Blue Ridge, I-70	43	41	41	43	
Forest Park	46	44	41	41	41
Linden Hills					
Mark Twain State Park	9	8	8	8	7
Rider Trail, I-70	40	40	40	40	42
Troost	47	46	44	43	44
West Alton					
¹ Blue Ridge, I-70 was Discontinued in 2023 Due to Vandalism. ² Linden Hills was Added in 2025 as Near Road Site to Replace Blue Ridge, I-70. ³ Arnold West and West Alton were Added in 2025 for Enhanced Monitoring Plan					

Table 7-2

Nitrogen Dioxide Design Values, ppb (Annual average of the hourly concentration values) ^{1,2,3}					
Yellow Highlights Indicate Design Values Exceeded the 1971 Standard (53 ppb)					
Site Name	2019	2020	2021	2022	2023
Arnold West					
Blair Street	11	10	10		10
Blue Ridge, I-70	10	9	10	10	
Forest Park	10	9	9	8	9
Linden Hills					
Mark Twain State Park	2	2	2	2	2
Rider Trail, I-70	10	9	10	10	10
Troost	11	10	10	10	11
West Alton					
¹ Blue Ridge, I-70 was Discontinued in 2023 Due to Vandalism. ² Linden Hills was Added in 2025 as Near Road Site to Replace Blue Ridge, I-70. ³ Arnold West and West Alton were Added in 2025 for Enhanced Monitoring Plan					

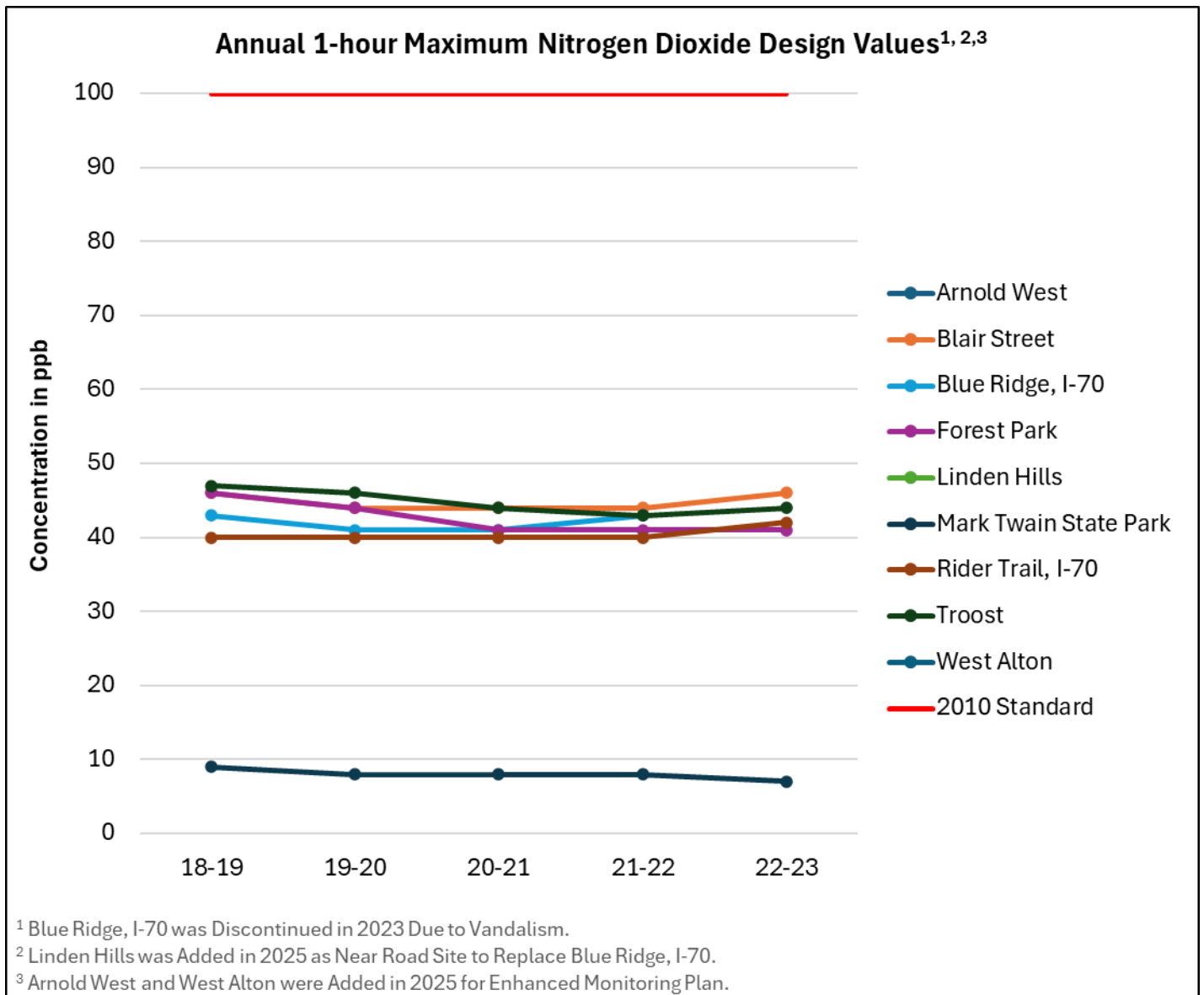


Figure 7-2. Nitrogen Dioxide Design Values, Annual 1-hour Maximum Standard

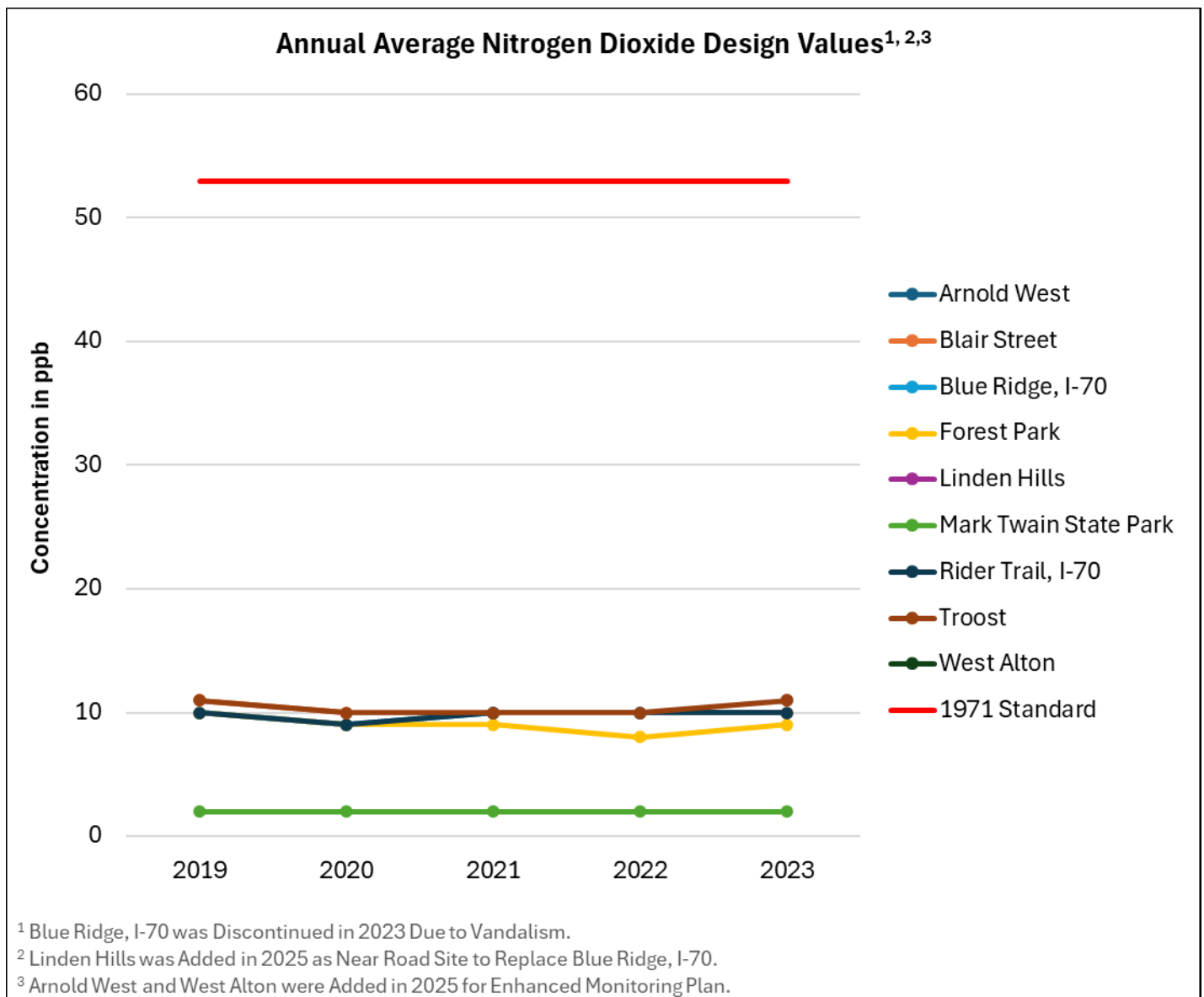


Figure 7-3. Nitrogen Dioxide Design Values, Annual Average Standard

7.3 NO_x Emissions

Per data from the 2020 NEI, electricity generation via combustion from point sources makes up around 30% of the NO_x emissions in Missouri while mobile sources and biogenics (vegetation and soil) make up around 44% and 16% respectively (point and area sources). A more detailed discussion of point, area (non-mobile), and mobile source NO_x emissions may be found in the sections below.

7.3.1 Point Source NO_x Emissions

Point source NO_x emissions were analyzed using 2020 NEI data. Statewide point source emissions on a county-by-county basis are presented in Figure 7-4. As shown in the figure, some of the higher

emissions are located within the boundaries of the St. Louis, Kansas City, and Springfield urban cores. In addition, areas of higher concentrations of relatively smaller sources are located within these boundaries, especially in St. Louis and Kansas City. Impacts from these sources on the areas could be significant.

Some large sources are located outside the urban cores, especially along the Missouri and Mississippi rivers. A relatively large concentration of point sources is also noted in the southwest part of the state, which is a growing area in terms of population. New Madrid (New Madrid County) and Thomas Hill Energy (Randolph County) power plants are the first and second largest point sources in Missouri, respectively. However, neither plant is located within the urban core or metropolitan statistical areas.

Statewide point source NO_x emissions have decreased significantly over the last 25 years, including a 14,000 ton decrease from emissions reporting year 2022 to emissions reporting year 2023. Per the Missouri Emissions Inventory System, total point source NO_x emissions in Missouri 2023 were approximately 59,000 tons.

7.3.2 Area Source NO_x Emissions

Figure 7-5 shows the area source emissions on a county-by county basis per the 2020 NEI. Area source emissions are highest in the St. Louis and Kansas City metropolitan areas and also somewhat elevated in the Springfield area. Area source emissions are less significant than point and mobile source emissions. Statewide area source emissions (excluding mobile) total about 67,000 tons per year.

7.3.3 Mobile Source NO_x Emissions

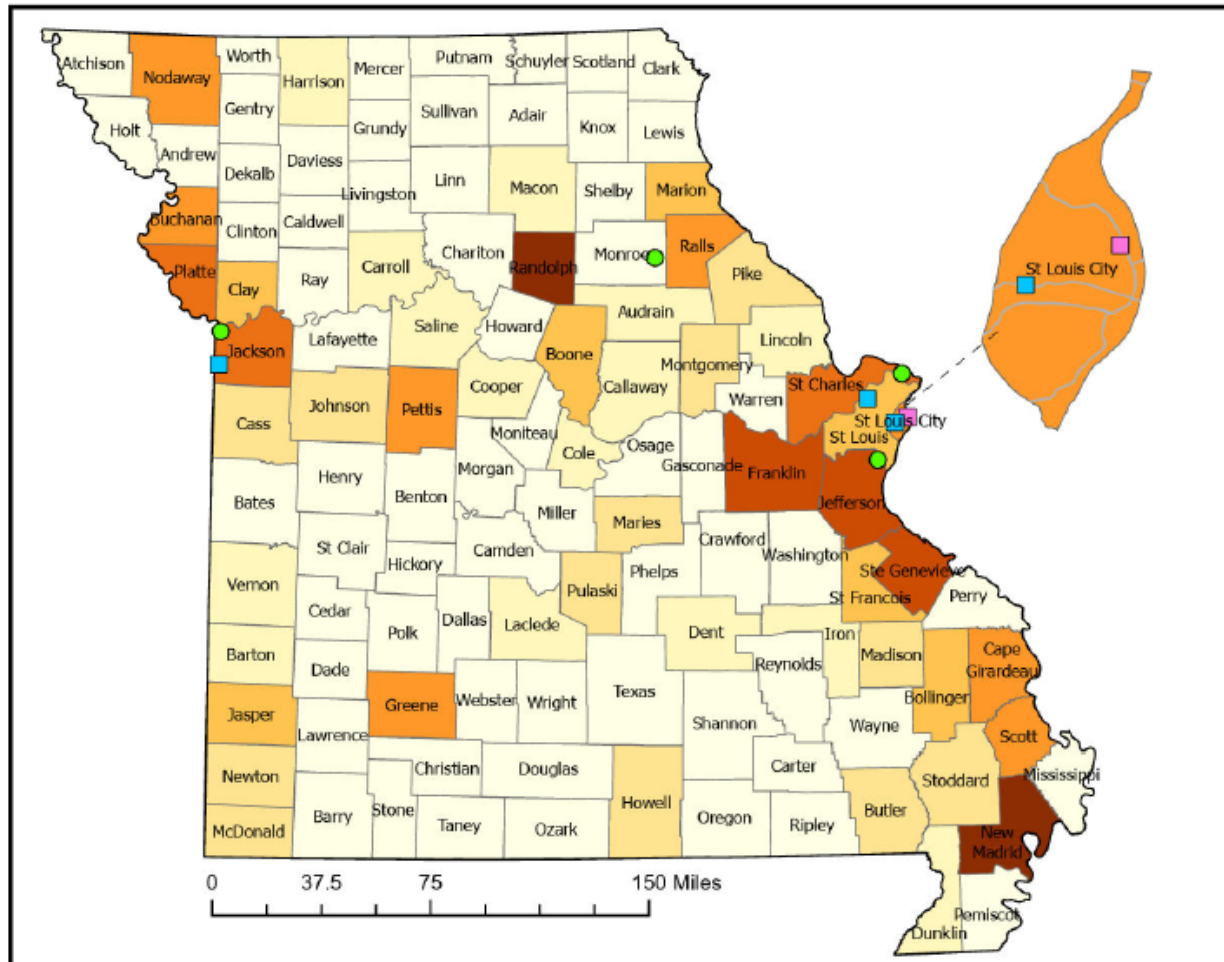
Figure 7-6 shows the mobile source emissions on a county-by county basis per the 2020 NEI. On-road mobile source NO_x emissions, like CO emissions (discussed in Section 5), are highest in areas with the highest traffic count as shown in Figures 5-7 and 5-8. Statewide mobile source NO_x emissions (on-road and off-road) totaled about 112,000 tons per the 2020 National Emissions Inventory.

Two near-roadway NO₂ monitoring sites are required in the St. Louis area and one site in the Kansas City area (40 CFR 58 Appendix D). The locations of the near-roadway sites were selected based on their proximity to highway segments with high traffic counts, on their suitability in meeting siting criteria (40 CFR 58 Appendix E), and on logistical considerations. The site selection process was described in detail in past Monitoring Network Plans.

The Linden Hills near-roadway site in Kansas City was established in 2025 to replace the Blue Ridge I-70 site as the Kansas City area near-roadway site, which was discontinued due to site security issues. Selection of the Linden Hills site was based on an analysis in 2023 that included review of traffic volumes. Traffic counts from the maps in Figure 5-8 were used as a starting point to determine which road segments should be further analyzed using the more recent traffic volume data available on the above-mentioned interactive map. Candidate sites were then evaluated based on siting criteria and logistical considerations.

Candidate St. Louis area near-roadway sites were originally identified using 2010 traffic counts from a map similar to the one shown in Figure 5-7. The two sites (Forest Park and Rider Trail I-70) were then selected based on suitability in meeting siting criteria and logistical considerations. Traffic counts from 2024 for the two sites remain at relatively high levels. The 2024 traffic count at Forest Park is 92% of the 2010 count, and the 2024 traffic count at Rider Trail I-70 is 105% of the 2010 count. Therefore, these two sites continue to be suitable for near-roadway monitoring.

Missouri Nitrogen Oxides (NO_x) Point Source Emissions



Legend

- NO₂ Monitor
- Near-Road NO₂ Monitor
- National Core Multipollutant Monitoring (NCore) NO_y Monitor

2020 Point Source Emissions for NO_x

Nitrogen Oxides

- 0.00 - 26.90
- 26.90 - 84.40
- 84.40 - 299.20
- 299.20 - 662.10
- 662.10 - 1179.10
- 1179.10 - 3606.90
- 3606.90 - 8730.20
- 8730.20 - 18240.70

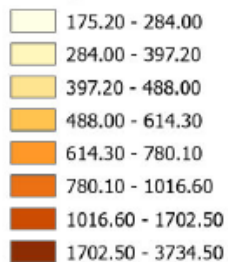


Figure 7-4. 2020 Missouri Statewide Point Source NO_x Emissions and the 2025 NO₂ Monitoring Network

A map of Missouri showing its 115 counties. The counties are color-coded into four regions: light orange (western and northwestern), medium orange (central), dark orange (southern and eastern), and dark brown (St. Louis area). A scale bar at the bottom indicates distances of 0, 37.5, 75, and 150 miles. Several locations are marked with colored dots: a green dot in Monroe County, a blue dot in Jackson County, a pink dot in St. Louis City, and a blue dot in St. Louis City. A dashed line connects the pink dot in St. Louis City to the blue dot in St. Louis City.

- NO₂ Monitor
- Near-Road NO₂ Monitor
- National Core Multipollutant Monitoring (NCore) NO₂ Monitor

Nitrogen Oxides



60

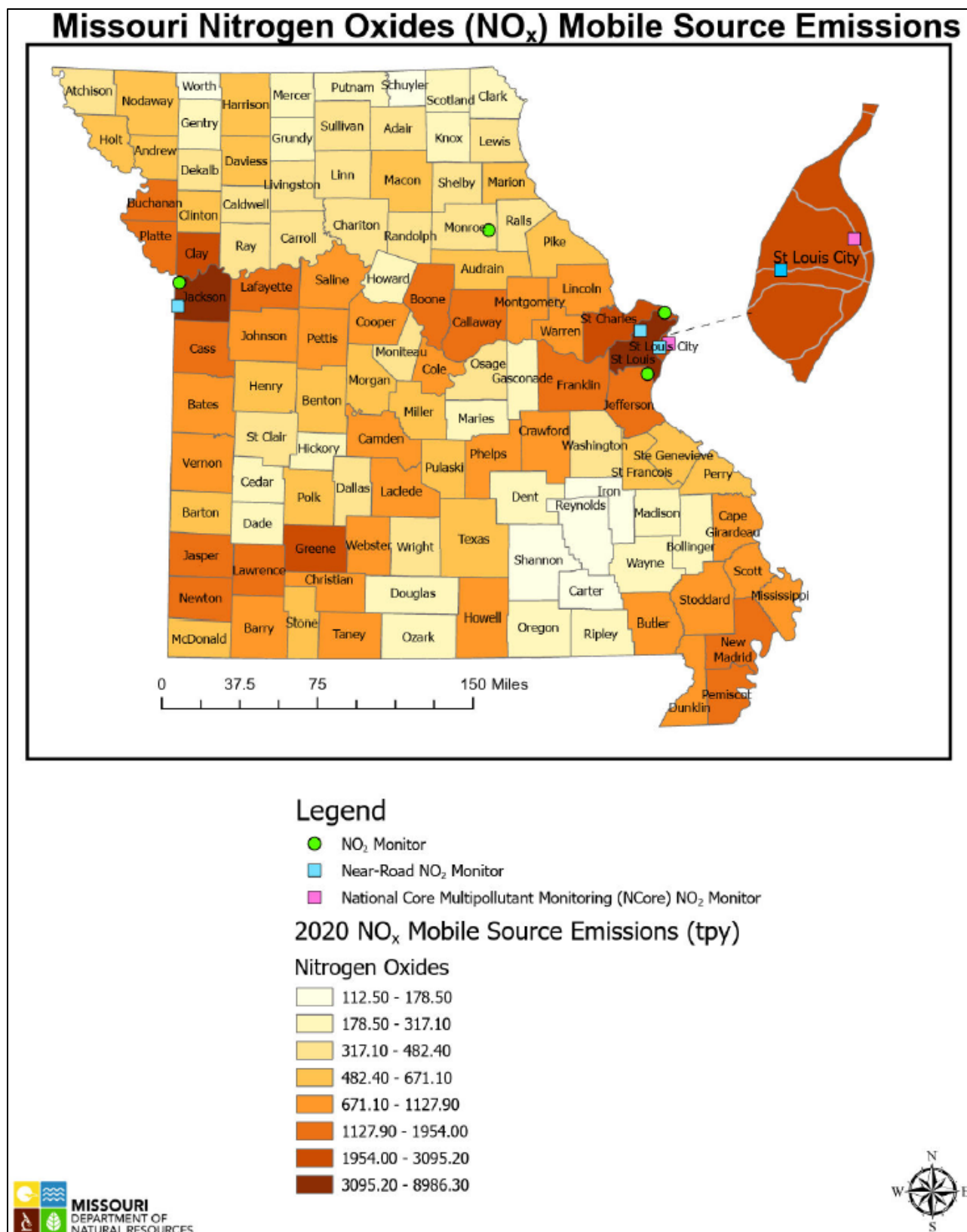


Figure 7-6. 2020 Missouri Statewide Mobile Source NO_x Emissions and the 2025 NO₂ Monitoring Network

7.4 Evaluation of the NO₂ Monitoring Network

None of the current NO₂ monitoring sites has shown a violation of the NAAQS in recent years. However, the Blair Street and Troost sites are judged to be critical because they are located in part to evaluate population exposure within the St. Louis and Kansas City urban areas. The Margareta site was previously identified as specifically meeting the requirement for monitoring the exposure of susceptible and vulnerable populations, but the Blair Street site received this designation based on the 2018 Monitoring Network Plan, which was approved by EPA. The Forest Park, Linden Hills and Rider Trail sites are also critical because they meet the requirement for near-road monitoring. The Mark Twain State Park site is judged to be credible to critical because it meets the need for measurement of regional background NO₂ concentration.

In addition to the NO₂ monitoring described above, NO_y (NO_y represents total reactive nitrogen oxides) monitoring is also being done at the Blair Street NCore site, and true NO₂ monitoring (either NO₂ monitoring using a photolytic NO₂ to NO converter or direct NO₂ monitoring using a cavity attenuated phase shift (CAPS) instrument) is required as a part of the Photochemical Assessment Monitoring Stations (PAMS) program. This monitoring is also critical, because it is required at all NCore and PAMS sites, respectively.

Finally, the West Alton and Arnold West sites are critical for further understanding ozone formation/movement in the St. Louis area.

8.0 PM₁₀ Network Assessment

8.1 Introduction: PM₁₀ Standards and Monitoring Requirements

The current primary and secondary PM₁₀ NAAQS is 150 µg/m³. The standards are met when the expected number of days with a 24-hour average concentration above 150 µg/m³ does not exceed one on average over a 3-year period, as determined in accordance with 40 CFR Part 50, Appendix K. Therefore, the design value for PM₁₀ is expressed as a number of days, not as a concentration. The NAAQS are listed in the [EPA NAAQS Table](#) on the internet. The PM₁₀ NAAQS was reviewed and not changed in 2020.

There are minimum monitoring requirements for PM₁₀ in each MSA. 40 CFR Part 58 Appendix D outlines the requirements as presented below in Table 8-1. The minimum requirements are based on the MSA population and the monitored PM₁₀ concentrations relative to the NAAQS.

Table 8-1 PM₁₀ Minimum Monitoring Requirements
(Approximate Number of Stations per MSA)¹

Population category	High concentration ²	Medium concentration ³	Low concentration ^{4,5}
>1 million (St. Louis and Kansas City)	6–10	4–8	2–4
500,000–1 million	4–8	2–4	1–2
250,000–500,000 (Springfield)	3–4	1–2	0–1
100,000–250,000	1–2	0–1	0

¹Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA.

²High concentration areas are those for which ambient PM₁₀ data show ambient concentrations exceeding the PM₁₀ NAAQS by 20% or more.

³Medium concentration areas are those for which ambient PM₁₀ data show ambient concentrations exceeding 80% of the PM₁₀ NAAQS.

⁴Low concentration areas are those for which ambient PM₁₀ data show ambient concentrations less than 80% of the PM₁₀ NAAQS.

⁵These minimum monitoring requirements apply in the absence of a design value.

8.2 PM₁₀ Monitoring Results in Missouri

The current PM₁₀ monitoring network is shown on the map in Figure 8-1. There are three sites in the St. Louis area, two in the Kansas City area, one in Springfield and three in the remainder of the state. Table 8-2 and Figure 8-2 show the PM₁₀ design values measured at Missouri sites in recent years. The design values have been less than 1.0 at all but one site. The Branch St. site is currently violating the PM₁₀ NAAQS. The air program is working with facilities to reduce PM₁₀ emissions so these locations continue to meet the standard.

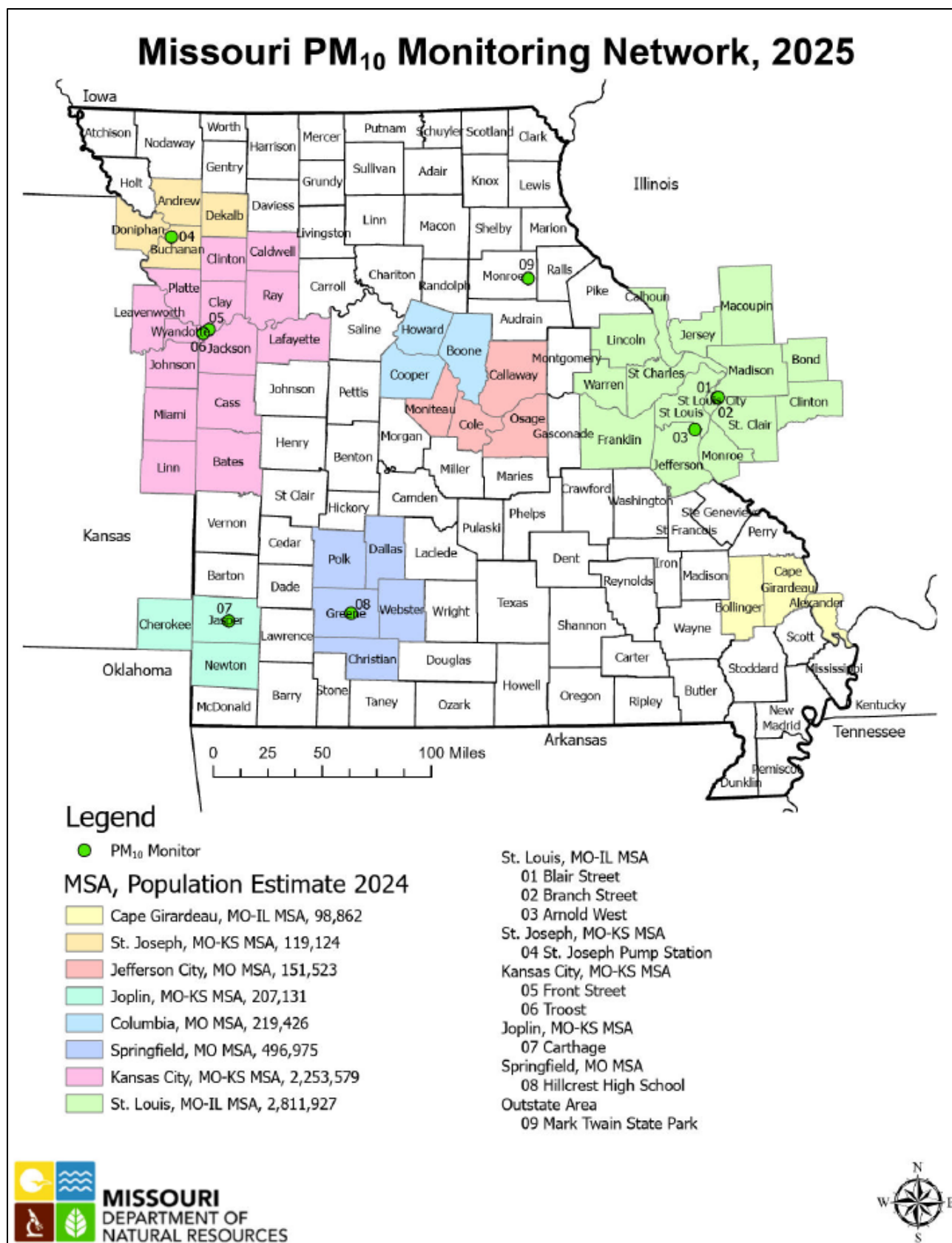


Table 8-2

Annual 24-hour PM ₁₀ Design Values (Annual Estimated Exceedances per Year, Averaged Over Three Consecutive Years) ¹					
Yellow Highlights Indicate Design Values Exceeded the PM ₁₀ Standard (1 Expected Exceedance)					
Site Name	17-19	18-20	19-21	20-22	21-23
Blair Street	0.0	0.0	0.0	0.0	0.0
Branch Street	0.3	0.0	0.8	1.8	2.8
Arnold West	0.0	0.0	0.0	0.0	0.0
Troost	0.0	0.0	0.0	0.0	0.0
Front Street	0.0	0.0	0.3	0.3	0.3
Hillcrest High School	0.0	0.0	0.0	0.0	0.0
Mark Twain State Park	0.0	0.0	0.0	0.0	0.0
Carthage	0.0	0.0	0.0	0.0	0.3
St. Joseph Pump Station	0.0	0.0	0.3	0.3	0.3
¹ Cells highlighted in this color have at least one incomplete quarter over the three year period and are estimates.					

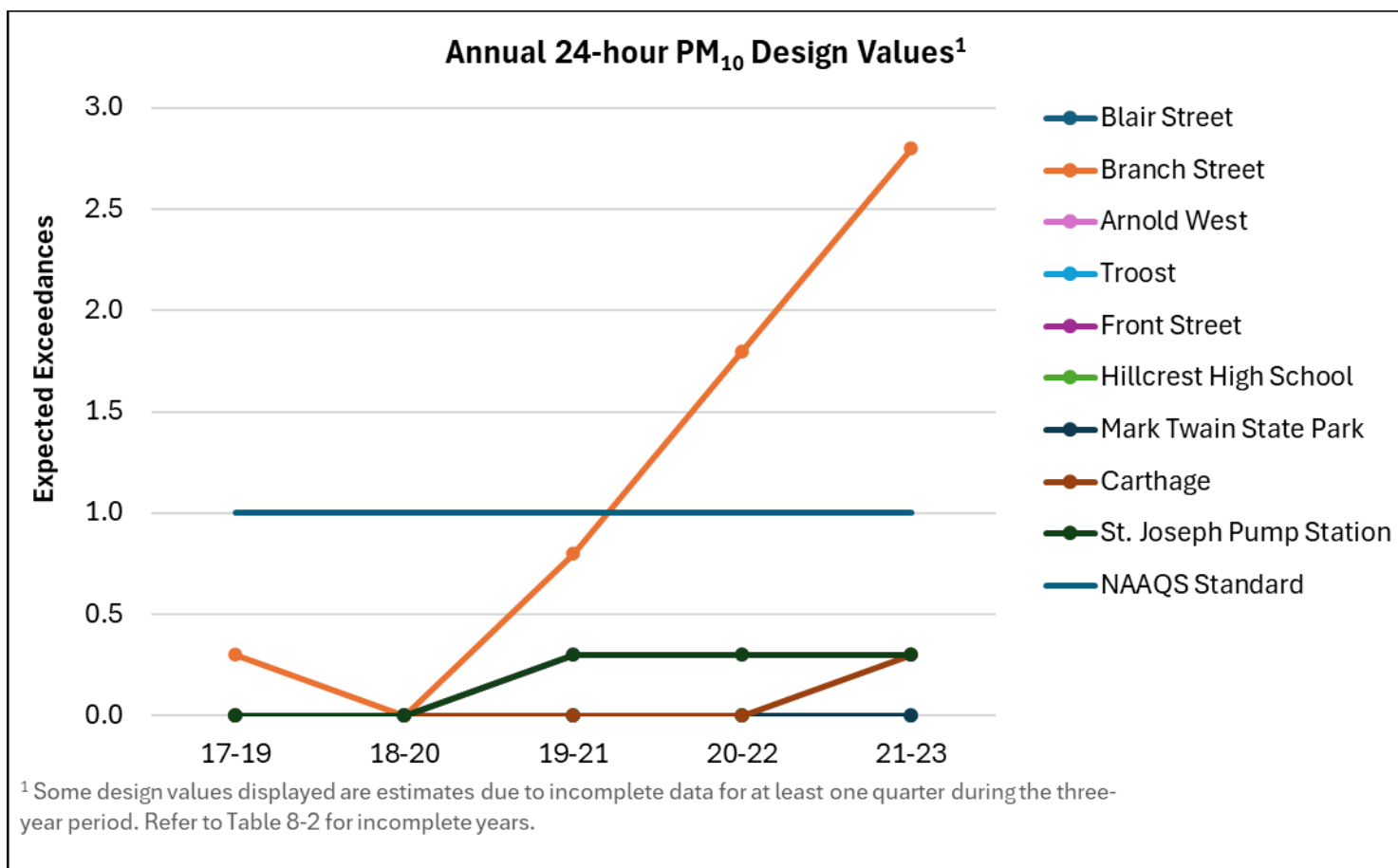


Figure 8-2. PM₁₀ Design Values

Table 8-3 and Figure 8-3 show the maximum 24-hour PM₁₀ concentrations at Missouri sites in recent years.

Table 8-3

Maximum 24-hour PM ₁₀ Concentrations in $\mu\text{g}/\text{m}^3$					
Site Name	2020	2021	2022	2023	2024
Blair Street	83.0	91.0	117.0	120.0	59.0
Branch Street	140.0	205.0	187.0	160.0	266.0
Arnold West	75.0	77.0	84.0	59.0	37.0
Troost	110.0	110.0	96.0	112.0	82.0
Front Street	144.0	163.0	139.0	83.0	172.0
Hillcrest High School	99.0	41.0	106.0	69.0	72.0
Mark Twain State Park	40.0	44.0	58.0	43.0	49.0
Carthage	113.0	127.0	131.0	174.0	151.0
St. Joseph Pump Station	101.0	169.0	105.0	84.0	107.0

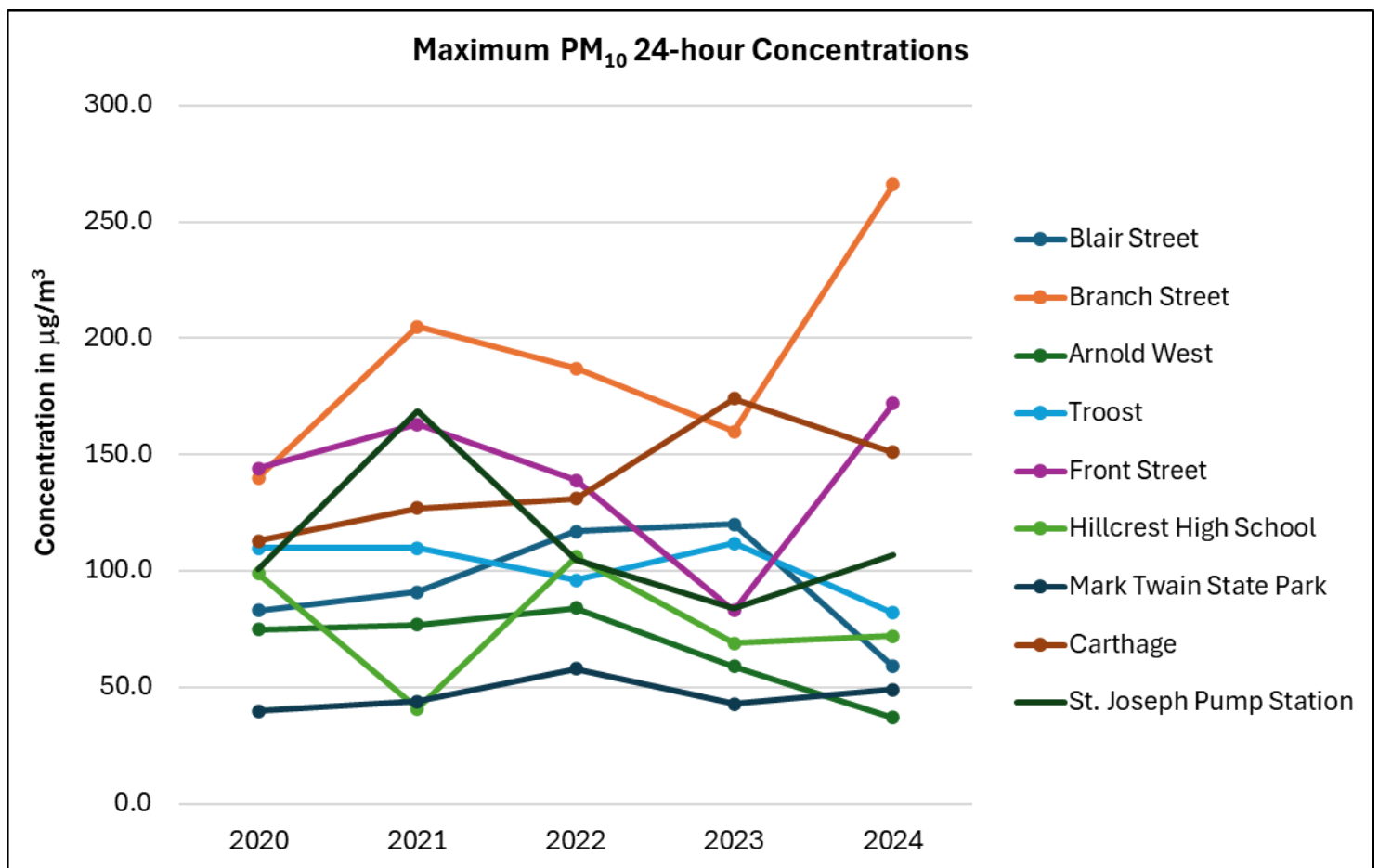


Figure 8-3. Maximum 24-Hour PM₁₀ Concentrations

8.3 PM₁₀ Emissions

8.3.1 Point Sources

According to the 2020 NEI, PM₁₀ point sources emitted nearly 12,000 tons according to the 2020 NEI. PM₁₀ emissions from electricity generation via combustion made up around 5,000 tons of the point source total, nearly half.

Area source (excluding mobile) emissions are by far the dominant PM₁₀ emission source in Missouri. According to the 2020 NEI, non-mobile area source PM₁₀ emissions were around 1.69 million tons in Missouri. The total PM₁₀ emissions in Missouri in 2020 was around 1.87 million tons.

Details of point, area (non-mobile), and mobile source SO₂ emissions by county may be found in Figure 8-4, 8-5, and 8-6, respectively.

A map of Missouri showing its counties, each colored according to the number of slaves held in 1860. The color scale ranges from light yellow (fewer slaves) to dark red (more slaves). The map shows a high concentration of slaves in the eastern part of the state, particularly in the St. Louis area and along the Mississippi River. Major cities like St. Louis, St. Charles, and St. Louis City are marked with green dots. A scale bar at the bottom indicates distances of 0, 37.5, 75, and 150 miles.

● PM₁₀ Monitor

PM₁₀

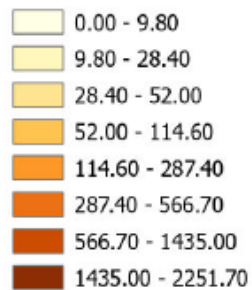


Figure 8-4. 2020 PM₁₀ Point Source Emissions and the 2025 Statewide PM₁₀ Monitoring Network

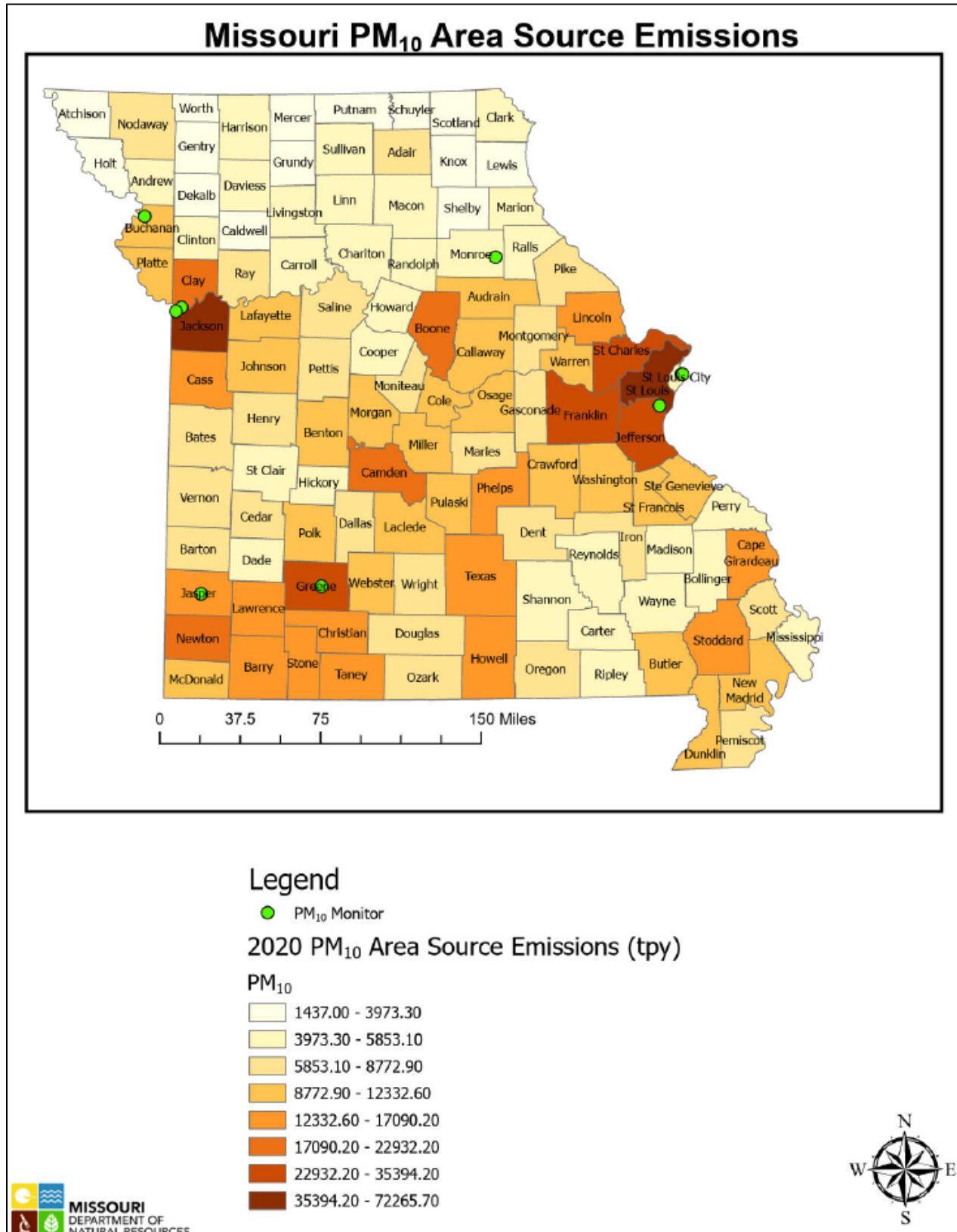


Figure 8-5. 2020 PM₁₀ Area Source Emissions and the 2025 Statewide PM₁₀ Monitoring Network

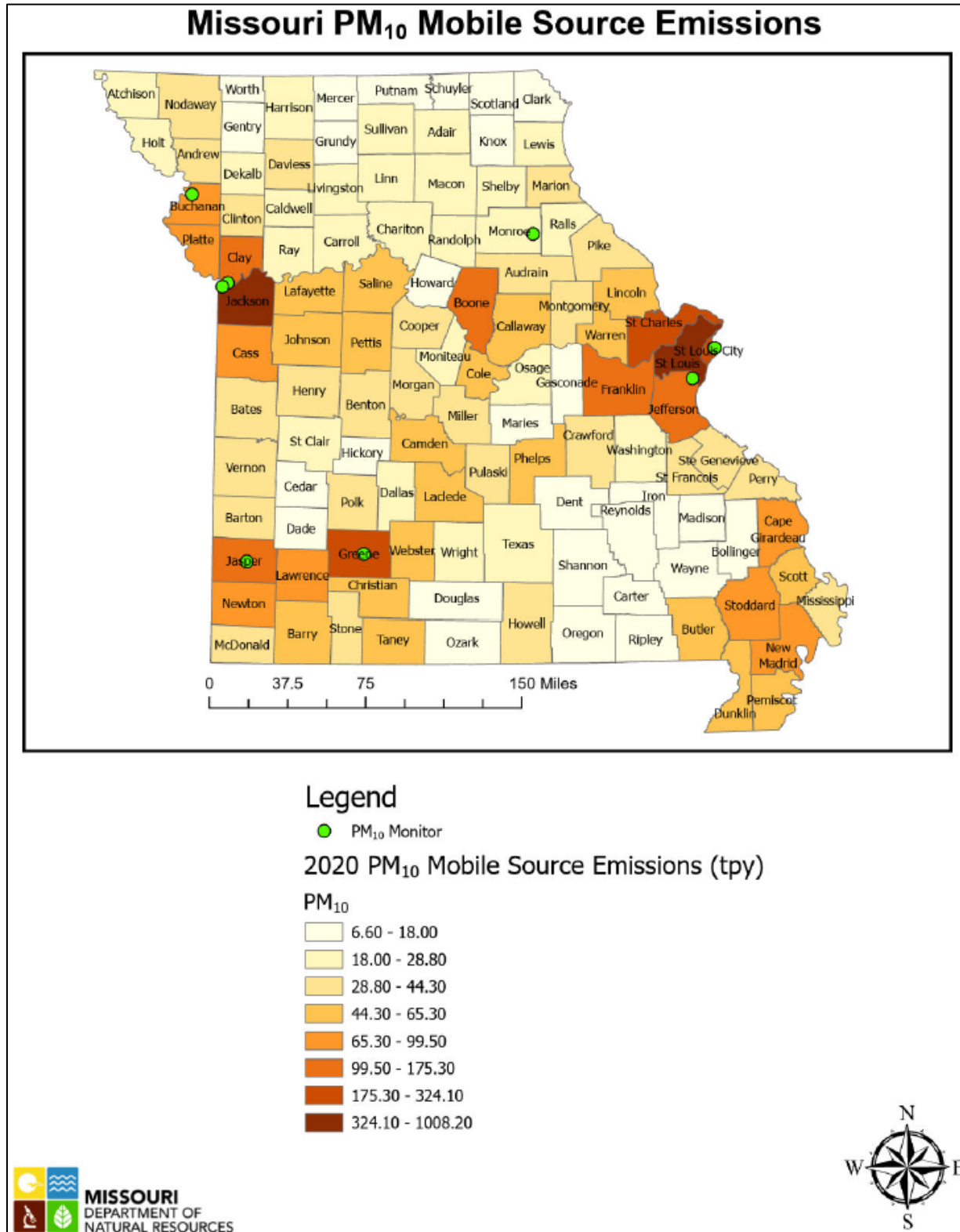


Figure 8-6. 2020 PM₁₀ Mobile Source Emissions and the 2025 Statewide PM₁₀ Monitoring Network

8.4 Evaluation of the PM₁₀ Monitoring Network

There are nine sites currently monitoring PM₁₀ concentrations in Missouri. There are three sites in the St. Louis area (one additional site in Illinois), two in the Kansas City area (two additional sites in Kansas), one in Springfield, and three in the remainder of the state (see Figure 8-1).

The Branch Street site is exceeding 120% of the standard. As a result, per Table 8-1, the St. Louis area falls into the ‘High’ category, requiring six to ten monitors. In the 2024 Monitoring Network Plan approval letter, EPA Region 7 stated:

The Branch Street monitoring site ambient PM₁₀ 24-hour average concentrations have exceeded the PM₁₀ NAAQS by at least 20% in recent years, including this year when currently uncertified data preliminarily shows several occurrences. While this meets the criteria for ‘High concentration’ and would increase the minimum number of monitors in 40 CFR 58 Appendix D Section 4.6, we note that the elevated concentrations and their causes appear to be localized and likely controllable with efforts by Missouri and Region 7 to obtain emissions reductions. Having consulted with EPA Region 5, we encourage Missouri to prioritize work to reduce concentrations and eliminate the requirement to install an additional monitor. Reducing emissions from localized sources affecting the monitor will provide a greater air quality benefit to the public than the installation of an additional monitor in the MSA. Please continue to coordinate with Region 7 staff on this issue.

The department agrees with this approach and will continue to work towards this goal to focus resources on reducing emissions around the Branch Street monitor instead of adding additional PM₁₀ monitors to the St. Louis area. The department will continue to coordinate with EPA Region 7 on this issue.

None of the other PM₁₀ monitors in Missouri are exceeding 120% of the standard. Both the Front Street and Carthage PM₁₀ monitors are regularly exceeding 80% of the 24-hour 150 µg/m³ PM₁₀ exceedance threshold (120 µg/m³). As a result, per Table 8-1, the Joplin and Kansas City areas fall into the ‘Medium’ category, requiring one to two and four to eight monitors, respectively. Both areas meet this requirement. There are two PM₁₀ monitors in Missouri and two in Kansas in the Kansas City area.

PM₁₀ sites are selected to represent one of the following scales:

1. Middle Scale: Defines the concentration typical of area up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometers.
2. Neighborhood Scale: Defines the concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers.
3. Regional Scale: Defines usually a rural area of reasonably homogeneous geography without large sources and extends from tens to hundreds of kilometers.

Branch Street is a source-oriented middle scale site that is in violation of the standard. The site is located in an area with significant sources and is critical in evaluating possible short-term exposure and also for evaluating the effectiveness of control of emission control strategies.

Similarly, the Carthage, Front Street, and St. Joseph Pump Station exceeded the standard in recent years and are located in an areas with significant sources, making them critical.

Low and stable PM₁₀ concentrations have been monitored at Blair Street, located slightly downwind of the urban core and in a mixed residential/industrial area. Because Blair Street is an NCore site, this site is critical.

Arnold West is critical because it is generally upwind of the central St. Louis area.

Troost is designated as an SPM site for PM₁₀ but is judged to be critical because it is helping to meet the minimum PM₁₀ network requirements in the Kansas City area and is measuring population exposure.

The Hillcrest High School site is judged to be critical because it is the only monitor in the Springfield area.

Mark Twain State Park is a regional scale site. It located far from the metropolitan areas and larger sources. It monitors rural (background) and regional concentrations for the state and is therefore a critical site.

9.0 Ozone Network Assessment

9.1 Introduction: Ozone Standards and Monitoring Requirements

The level of the current ozone (O₃) primary and secondary NAAQS is 0.070 ppm (70 ppb). The form of the standard is the three-year average of the annual fourth-highest daily maximum 8-hour concentration. The NAAQS are listed in the [EPA NAAQS Table](#) on the internet.

Table 9-1 from 40 CFR, Part 58, Appendix D presents the minimum requirements for O₃ monitoring. States (or local agencies) must operate O₃ sites for various locations depending on the size of the area and typical O₃ peak concentration. The NCore sites are expected to complement the SLAMS O₃ data. Both SLAMS and NCore sites can be used to meet the network minimum requirements. The total number of O₃ sites necessary to meet basic O₃ monitoring objectives will generally include more sites than the required minimums in Table 9-1. The break point of 85% of the NAAQS is currently 0.0595 ppm.

Table 9-1. SLAMS Minimum O₃ Monitoring Requirements

MSA population^{1,2}	Most recent 3-year design value concentrations $\geq 85\%$ of any O₃ NAAQS³	Most recent 3-year design value concentrations $< 85\%$ of any O₃ NAAQS^{3,4}
>10 million	4	2
4–10 million	3	1
350,000–<4 million	2	1
50,000–<350,000 ⁵	1	0

¹Minimum monitoring requirements apply to the metropolitan statistical area (MSA).

²Population based on latest available census figures.

³The O₃ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50.

⁴These minimum monitoring requirements apply in the absence of a design value.

⁵Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

One or more O₃ site(s) for each MSA must be designed to record the maximum concentration for that particular area. Network design must also consider other factors including geographic size, population density, complexity of terrain and meteorology, adjacent O₃ monitoring programs and air pollution transport from neighboring areas.

The basic O₃ monitoring objectives include:

- Public data reporting.
- Air quality mapping.
- NAAQS compliance.
- Understanding O₃-related atmospheric processes.

The monitoring season for O₃ monitoring in Missouri is from March through October of each year.

9.2 O₃ Monitoring Results in Missouri

9.2.1. Ozone Design Values

There are currently 22 sites that monitor O₃ in Missouri (Figure 9-1). Seven sites are in the St. Louis area, and five are in the Kansas City area. Ste. Genevieve County and the southeast areas each have one site. Two sites are located in Springfield, and there are six sites in other areas of the state.

These sites represent the following spatial scales defined in 40 CFR, Part 58, Appendix D:

1. Neighborhood: Defines the concentrations within some extended area of the city that has relatively uniform land use with dimensions in the range of 0.5 to 4.0 kilometers.
2. Urban: Defines the concentrations within an area of the city with dimensions of 4.0 to 50 kilometers.
3. Regional: Defines usually a rural area of reasonably homogeneous geography without large sources and extends from tens to hundreds of kilometers.

Table 9-2 and Figures 9-2, 9-3, and 9-4 show the O₃ design values measured at Missouri sites in recent years. Yellow highlights in the table indicate design values that exceed the standard. Six sites exceeded the standard in the most recent three-year period (2021 to 2023); however, 2024 ozone data recently certified by the department indicates that the 2022 to 2024 design values of three sites will continue to violate the standard. The department is has resumed researching whether an exceptional event demonstration may be feasible and appropriate for ozone concentrations measured in 2023 that may have been impacted by Canadian wild fires.

St. Louis Area

As shown in Table 9-2 and Figure 9-2, Arnold West, Blair Street, Maryland Heights, and West Alton were in violation of the standard for the most recent three-year period (2021-2023). No sites were in violation of the standard for the previous three year period (2020 – 2022). The West Alton and Orchard Farm sites are located relatively downwind (see Section 3.0 and Appendix A) and at the exterior of the St. Louis metropolitan area. Blair Street is relatively close within the core of the urban area. Pacific and Arnold West are located southerly and generally upwind of the St. Louis urban core, not in the most prevalent wind direction. Foley, replaced by Foley West because of a change in property ownership, is located downwind but at a greater distance from the core of the metropolitan area.

The West Alton site is located about 16 miles north of the center of St. Louis between the Missouri and Mississippi Rivers and about seven miles northwest of their confluence. The West Alton area is relatively flat, with elevation about 420 to 430 feet above sea level. The area is subject to flooding when the water level in the rivers rises, and there was widespread flooding in the area during the spring and early summer in 2019. The site was inoperative from May 2 to 16 and May 22 to July 16, 2019, because it was removed to avoid damage due to flooding. The

department has evaluated the days with missing O₃ measurement at West Alton based on temperature and on ozone concentrations measured at nearby sites. Based on this evaluation, 62 of the 72 missing days were not contributing to ozone concentrations above the level of the standard. Therefore, the data completeness requirement for the site was still met in 2019. Since that time, because of the importance of the site, the department has elevated the station to a height believed to be sufficient to continue to monitor in the event of future floods.

Kansas City Area

As shown in Table 9-2 and Figure 9-3, with the exception of Rocky Creek, all of the sites in the Kansas City area were within the standard for the most recent three-year period (2021 to 2023). Prior to that, all sites in the Kansas City area met the current standard for eight consecutive three-year periods. However, Trimble, Watkins Mill, Liberty, and Rocky Creek, in the Kansas City area violated the current standard in the past. These four sites are located north and downwind relative to the central Kansas City and on the outskirts of the Kansas City metropolitan area. The Richards Gebaur-South site is located generally upwind and at a distance, beyond the immediate areas of the central part of the metropolitan area.

Remainder of the State

With the exception of Farrar, all of the other ozone sites in Missouri were in attainment of the standard for the most recent three-year period (2021-2023). Prior to that, all other sites the current standard for eight consecutive three-year periods. However, Alba, Farrar, and Bonne Terre have violated the current standard in the past.

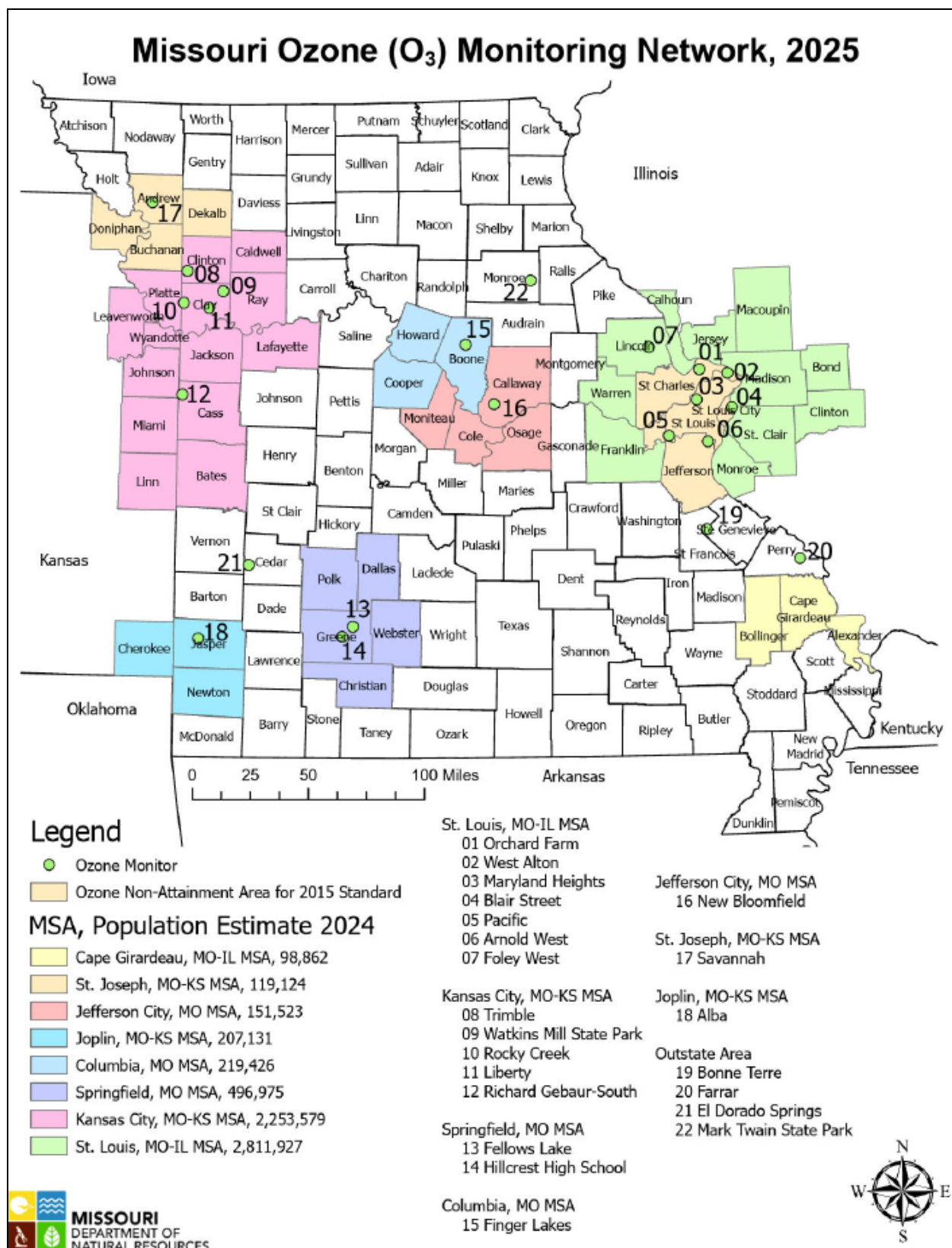


Figure 9-1. The 2025 Missouri Ozone Monitoring Network

Table 9-2

Ozone Design Values, ppb (3-Year Average of Annual Fourth-Highest Daily Maximum 8-Hour Concentration)¹					
Yellow Highlights Indicate Design Values Exceeded the Standard (70 ppb)					
Site Name	17-19	18-20	19-21	20-22	21-23
Arnold West	67	67	68	68	72
Blair Street	69	68	65	67	71
Foley West	66	65	63	64	68
Maryland Heights	68	71	69	68	71
Orchard Farm	69	68	66	65	68
Pacific	65	66	64	63	67
West Alton	71	71	68	69	72
Liberty	68	67	64	66	69
Richard Gebaur-South	64	62	61	61	66
Rocky Creek	68	66	66	68	71
Trimble	65	64	62	63	68
Watkins Mill State Park	68	66	64	65	67
Alba	62	61	60	63	67
Bonne Terre	63	62	62	63	68
El Dorado Springs	60	59	57	60	66
Farrar	64	62	62	64	71
Fellows Lake	61	58	57	59	66
Finger Lakes	60	59	57	57	62
Hillcrest High School	61	59	59	61	66
Mark Twain State Park	59	58	55	54	59
New Bloomfield	60	60	59	59	63
Savannah	63	62	60	61	64
¹ West Alton's 2019 – 2021 design value meets completeness criteria with EPA approval to allow counting 62 missing days when calculating the 2019 data completeness.					

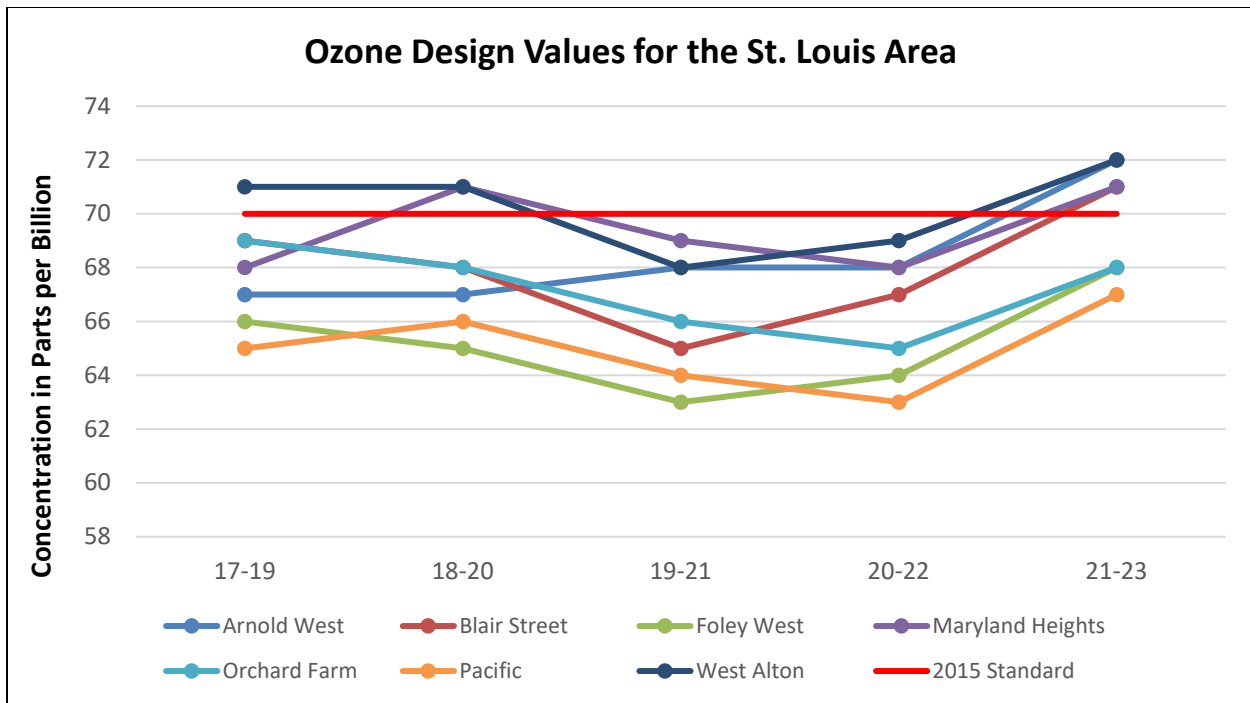


Figure 9-2. Ozone Design Values for the St. Louis Area

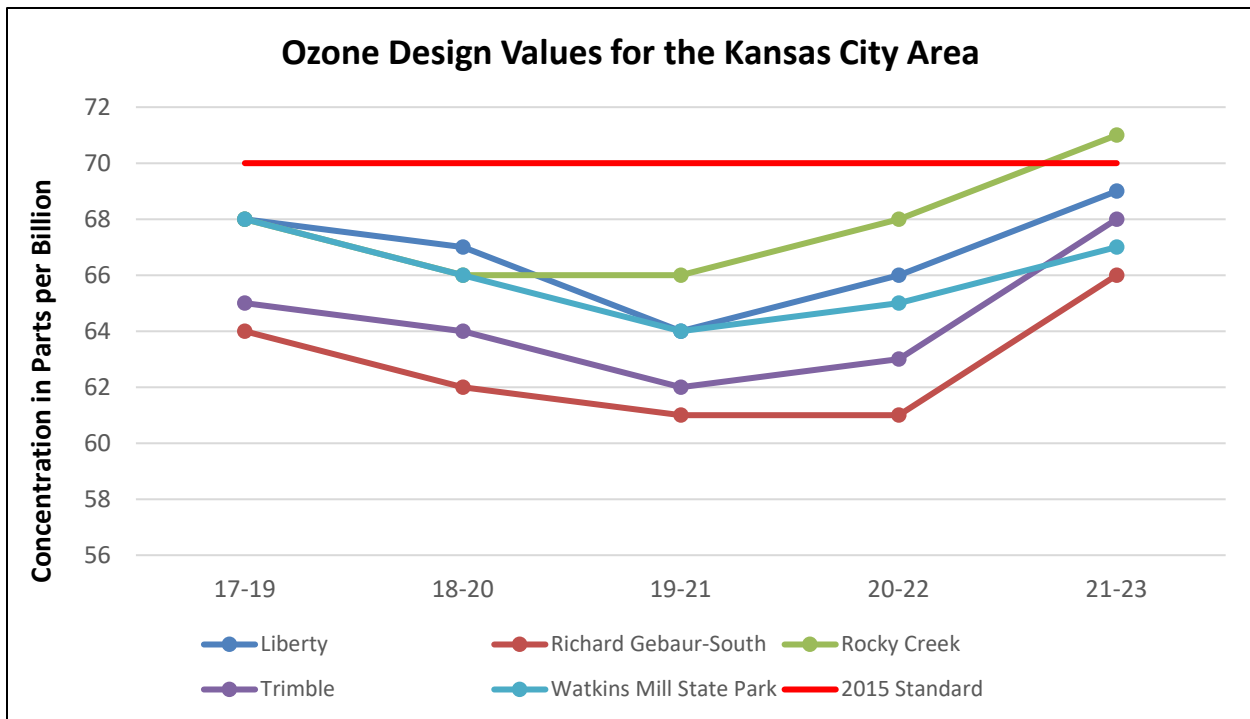


Figure 9-3. Ozone Design Values for the Kansas City Area

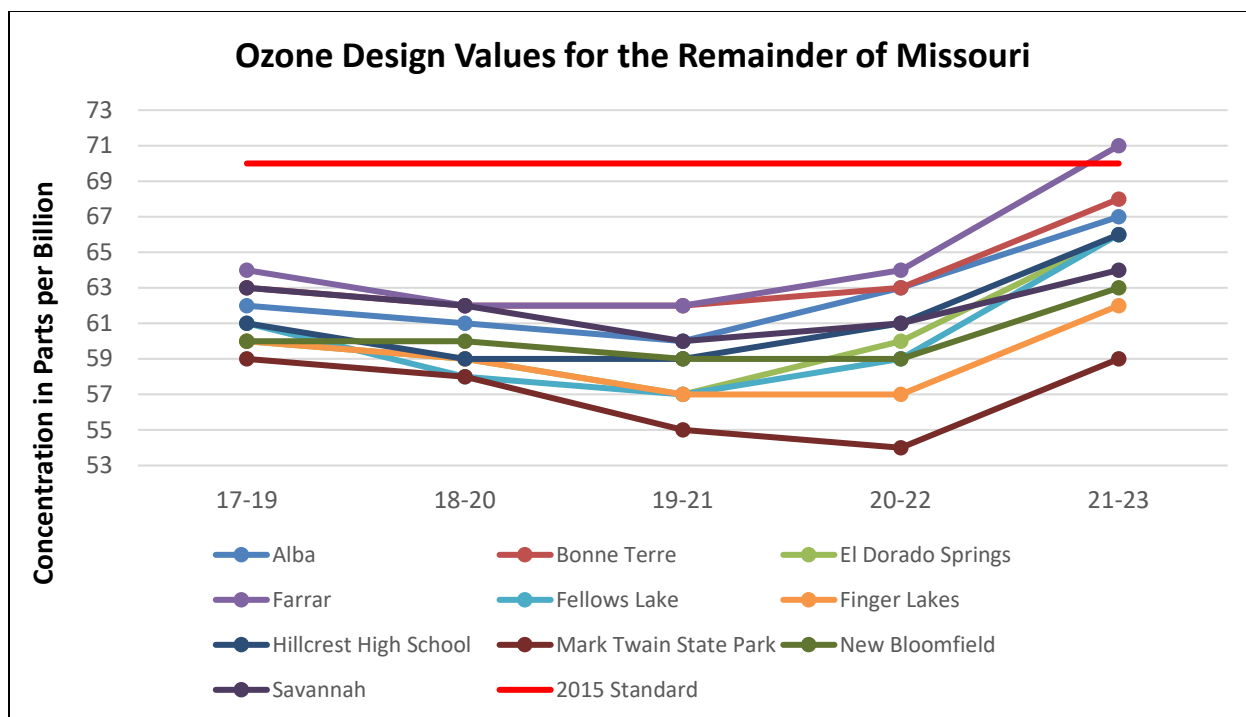


Figure 9-4. Ozone Design Values for the Remainder of Missouri

9.2.2 Application of Ambient Air Monitoring Network Assessment Tools

Tools for use in network assessments were originally developed and made available online by EPA at the time of preparation of 2010 network assessments, updated for the 2015 network assessments by the Lake Michigan Air Directors Consortium (LADCO), and updated by EPA for use in the 2020 and 2025 network assessments. The [2025 version](#) is available online. The tools are primarily applicable to assessment of O₃ and PM_{2.5} networks. Results of the application of these tools to the Missouri O₃ network are presented in this section. The tools use data through 2023.

Area Served

The area served tool uses a spatial analysis technique to show the area represented by each monitoring site within a defined region. The shape and size of each polygon surrounding a site is determined by the proximity of the nearest neighboring sites. All points within a polygon are closer to the monitor in that polygon than to any other monitor. The tool only uses geometric analysis; there is no consideration of source locations, terrain or meteorology. Figure 9-5 shows the area served polygons surrounding each Missouri O₃ site. The polygons are smaller in the St. Louis and Kansas City areas, because there are relatively more sites in those areas.

Correlation Matrices

The correlation matrix tool generates a display that summarizes the correlation, relative difference and distance between pairs of monitoring sites. The numbers in the boxes below the diagonal in each matrix are the number of observations used in each correlation between two sites. The intensity of the shading represents the Pearson correlation for each pair of sites, with the darker shading indicating the weakest correlation. The numbers in the boxes above the

diagonal are the distances in kilometers between the two sites. The intensity of the shading represents the mean absolute difference in ppm between each pair of site, with the darker shading indicating the greatest difference. The number in each diagonal box is the 2021 to 2023 design value for each site.

Figure 9-6 shows the correlation matrix for sites in the St. Louis area, including both Missouri and Illinois sites. The highest correlations and least differences in design values between sites, indicated by the lightest shading, are generally between sites that are close together. The sites to the north, generally downwind of central St. Louis, tend to be correlated with each other.

Figure 9-7 shows the correlation matrix for sites in the Kansas City area, including both Missouri and Kansas sites. As with the St. Louis area sites, the highest correlations and least differences in design values between sites, indicated by the lightest shading, are generally between sites that are close together. Sites to the south, generally upwind of central Kansas City tend to be correlated with each other, and sites to the north, generally downwind of central Kansas City tend to be correlated with each other.

Removal Bias

The removal bias tool uses the nearest neighbors to each site being evaluated to estimate the concentration at the location of the site if the site had never existed. This is done using an algorithm with inverse distance squared weighting. The squared distance allows for higher weighting on concentrations at sites located closer to the site being examined. The bias is calculated for each day at each site by taking the difference between the predicted value from the interpolation and the measured concentration. A positive average bias means that if the site being examined was removed, the estimated concentration from the neighboring sites would be larger than the measured concentration. A negative average bias means that the estimated concentration from the neighboring sites is less than the measured concentration.

Figure 9-8 shows graphically the removal bias results for St. Louis area sites based on 2021-2023 data. As indicated by the blue color, the average concentration at Blair Street, Arnold West, Foley West, Alton, IL and Maryville, IL, would be underestimated if estimated from neighboring sites. As indicated by the red color, the concentration at Pacific and Orchard Farm would be overestimated if estimated from neighboring sites. The concentration at West Alton would be slightly underestimated, and the concentration at Maryland Heights would be slightly overestimated.

Figure 9-8 shows graphically the removal bias results for St. Louis area sites based on 2021-2023 data. As indicated by the blue color, the average concentration at Blair Street, Arnold West, Foley West, Alton, IL, and Maryville, IL would be underestimated if estimated from neighboring sites. As indicated by the red color, the concentration Pacific and Orchard Farm would be overestimated if estimated from neighboring sites. The concentration at West Alton would be slightly overestimated, and the concentration at Maryland Heights would be slightly underestimated.

Figure 9-9 shows graphically the removal bias results for Kansas City area sites based on 2021 to 2023 data. As indicated by the blue color, the concentrations at Liberty, Rocky Creek, and

Richards Gebaur-South would be underestimated using neighboring sites. As indicated by the red color, the concentrations at Watkins Mill, Trimble, and the JFK sites would be overestimated from neighboring sites.

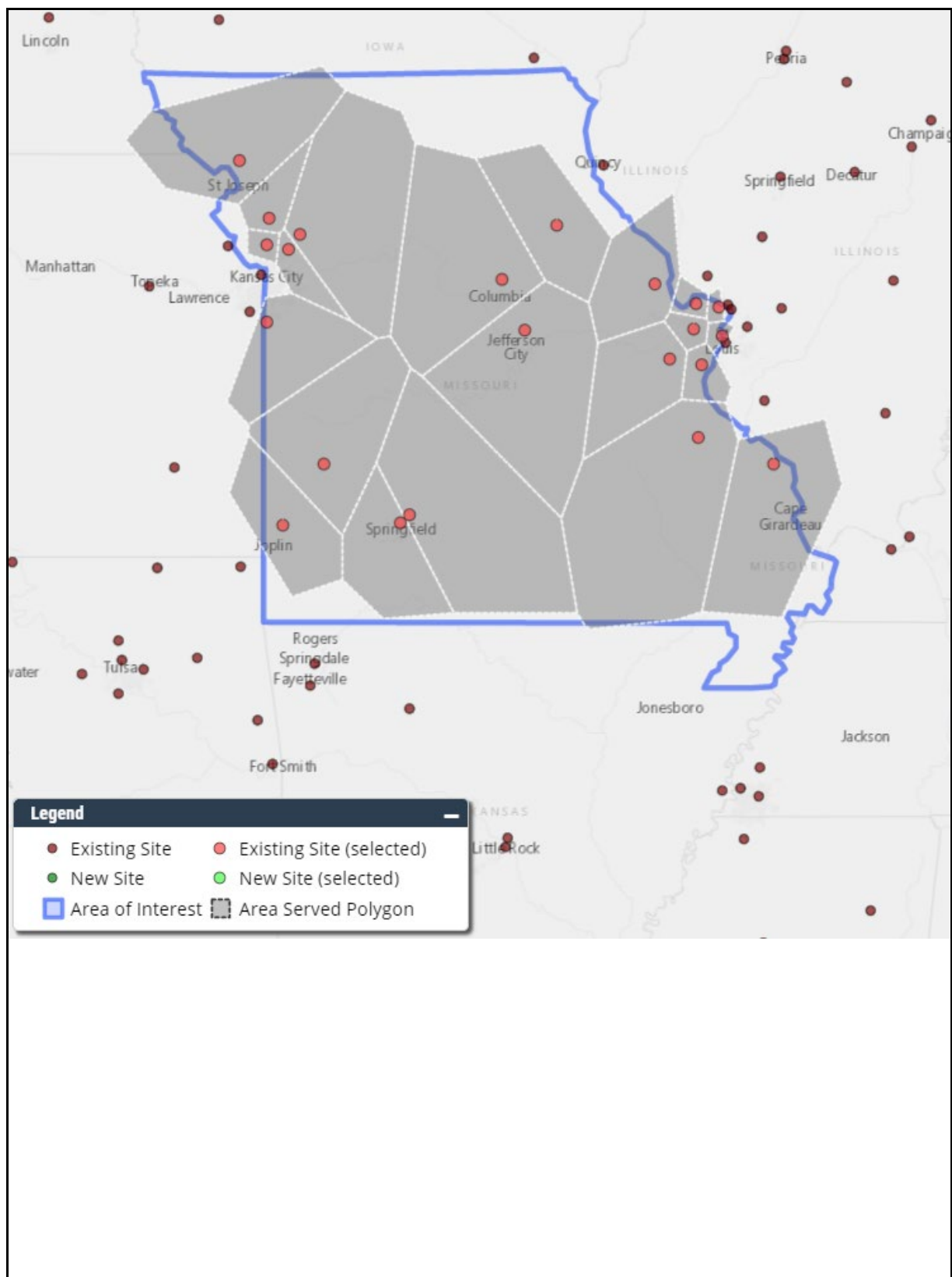


Figure 9-5. Area Served Polygons for Missouri O₃ Sites

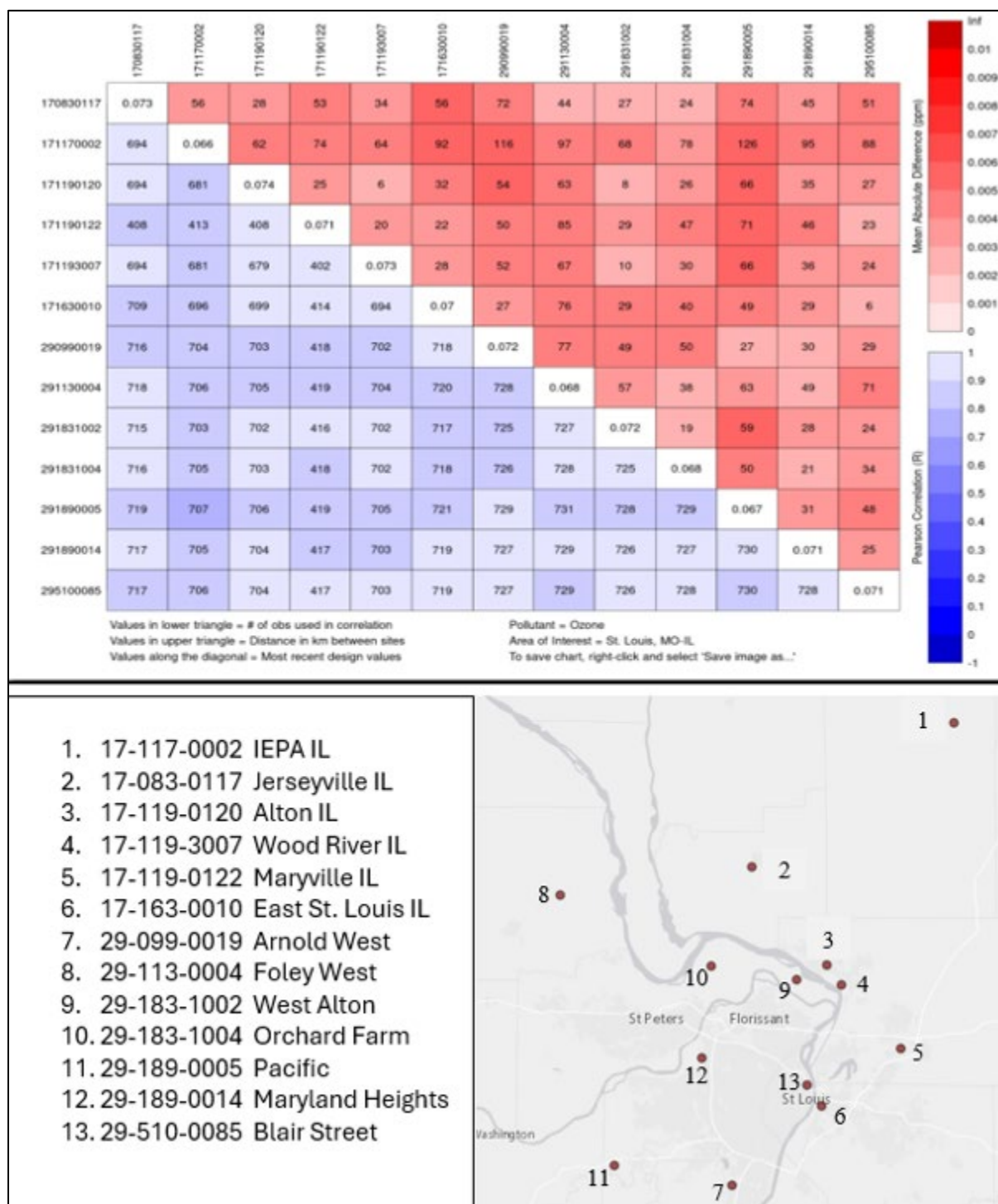


Figure 9-6. Correlation Matrix for St. Louis Area O₃ Sites

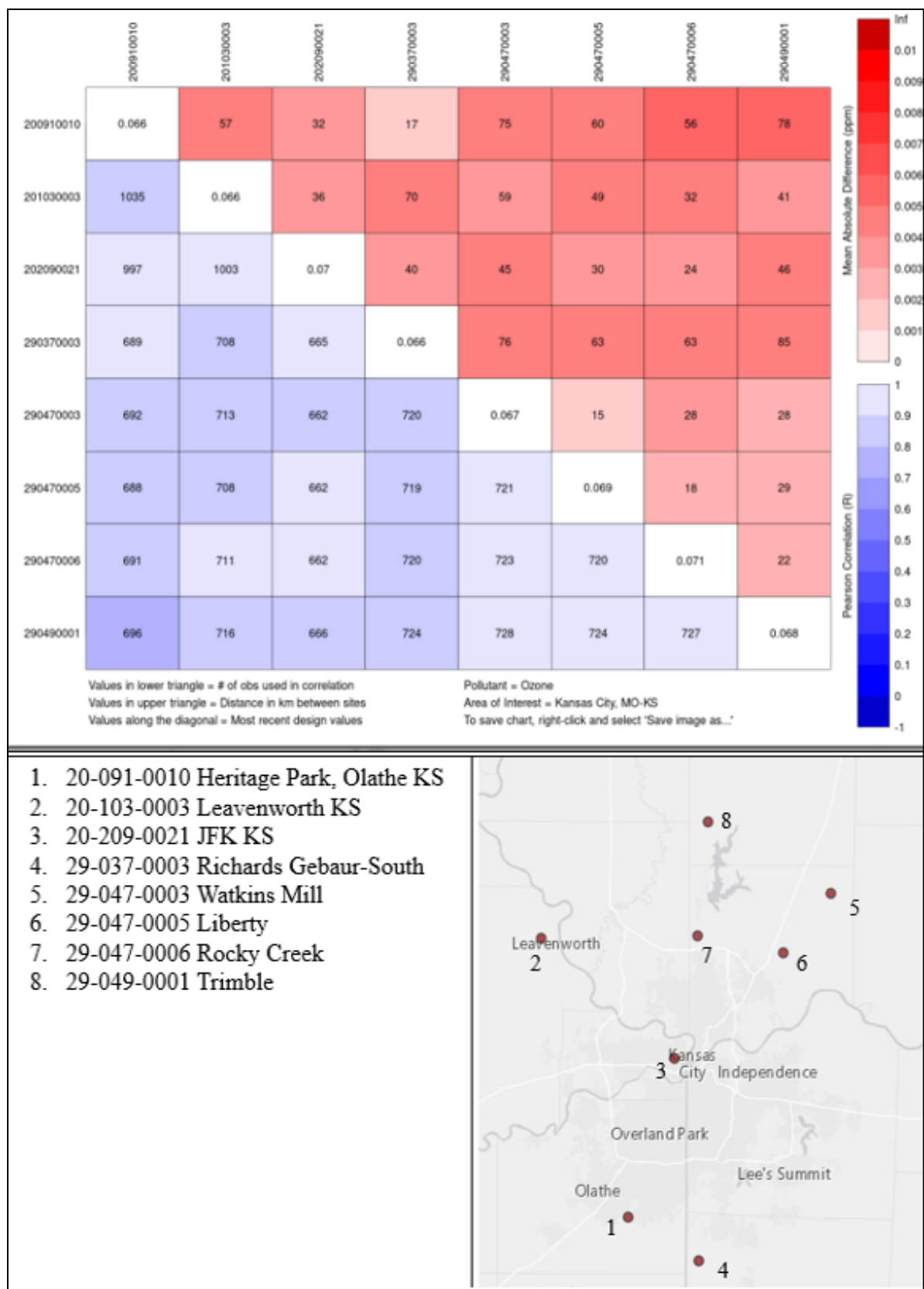


Figure 9-7. Correlation Matrix for Kansas City Area O₃ Sites

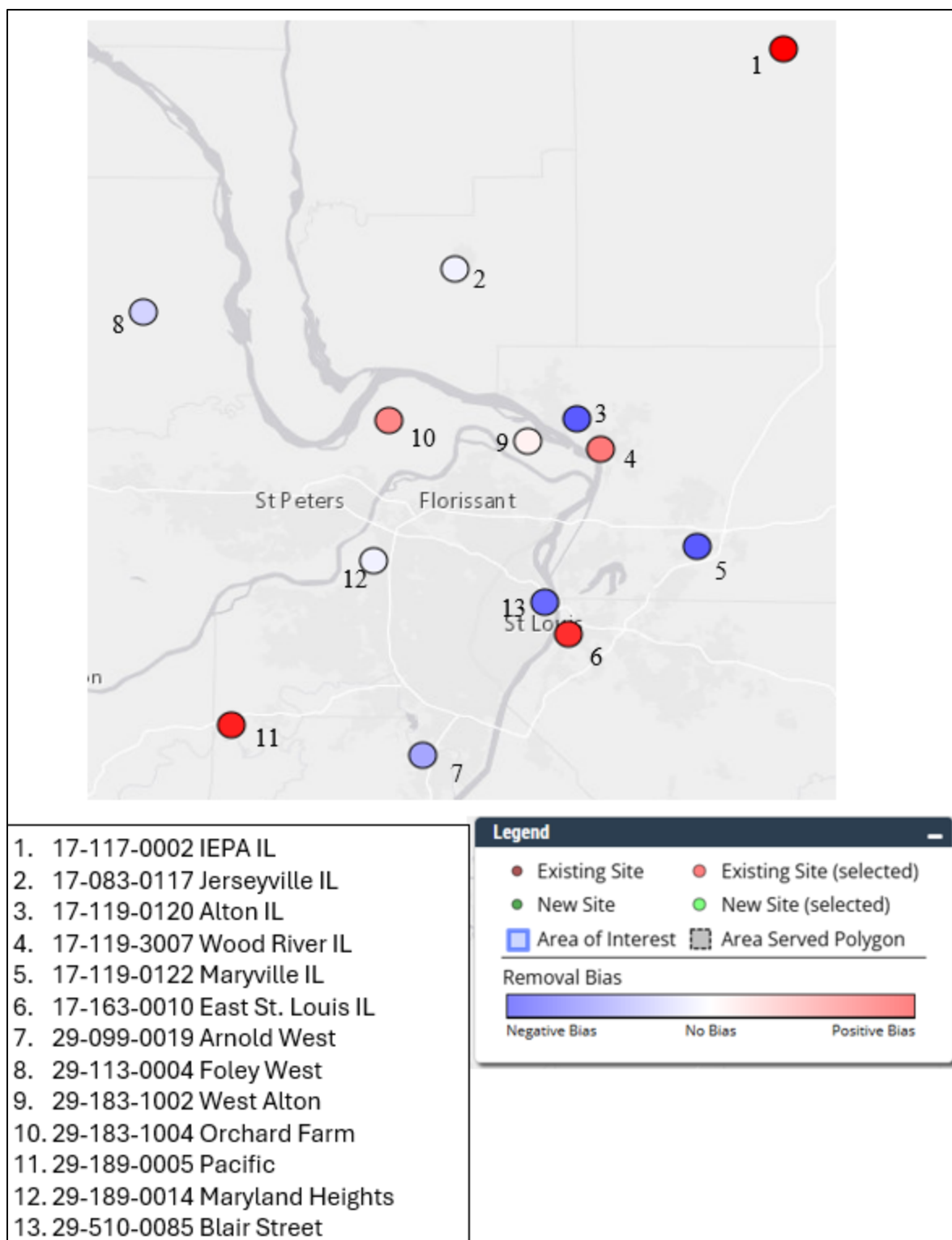


Figure 9-8. Removal Bias for St. Louis Area O₃ Sites

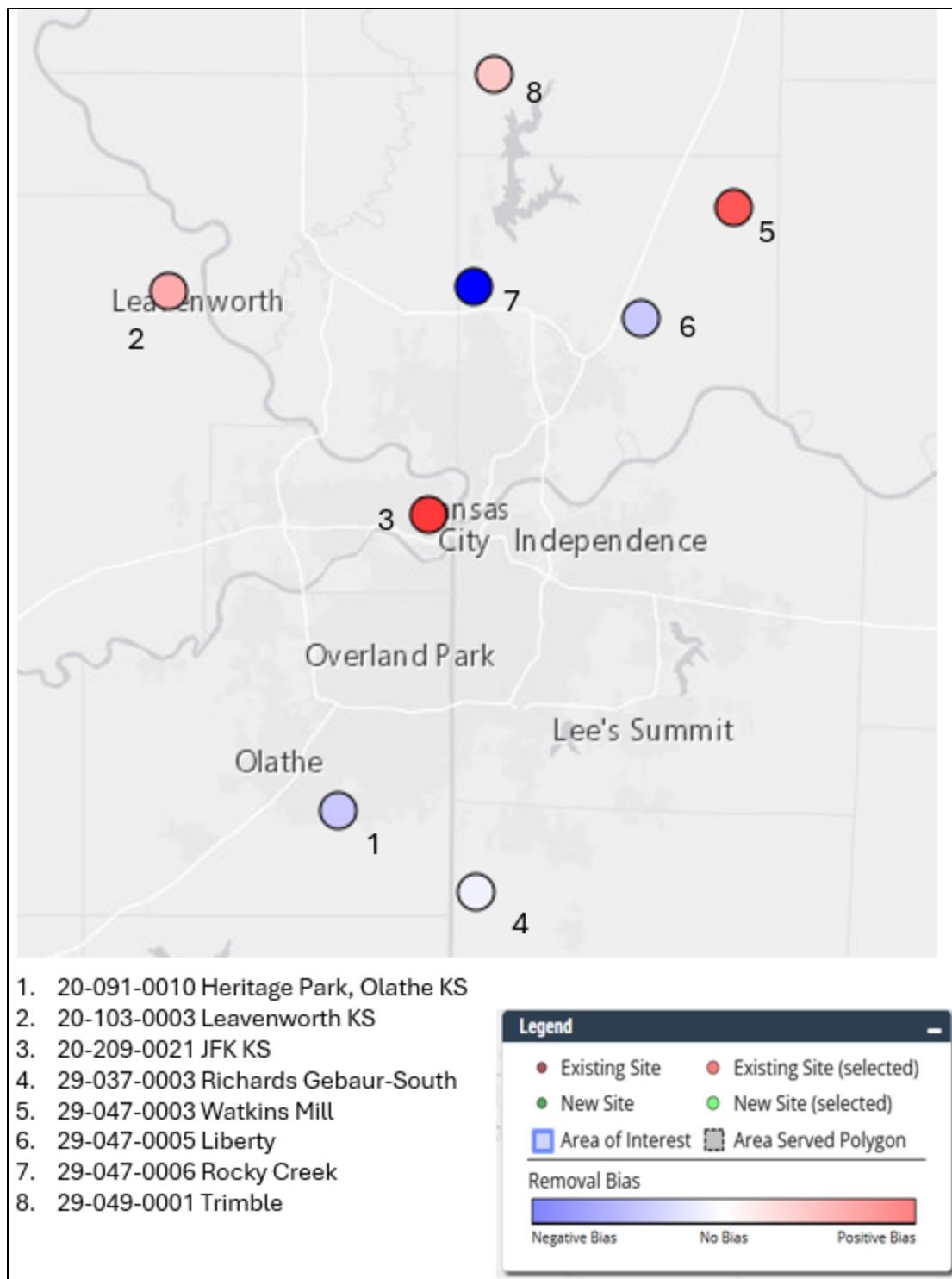


Figure 9-9. Removal Bias for Kansas City Area O₃ Sites

9.3 Ozone Precursor Emissions

NO_x and VOCs are known precursors of O₃. Point, mobile, and area NO_x emissions are discussed in Section 7.3.

Per data from the 2020 NEI, electricity generation via combustion from point sources makes up around 30% of the NO_x emissions in Missouri while mobile sources and biogenics (vegetation and soil) make up around 44% and 16% respectively (point and area sources). A more detailed discussion of point, area (non-mobile), and mobile source NO_x emissions may be found in the sections below.

9.3.1 Point Source Emissions

NO_x point source emissions are shown in Figure 7-4. VOC point source emissions and ozone monitoring sites are shown in Figure 9-10. The emission data on these maps is based on information from the 2020 NEI.

A great number of NO_x and VOC sources are located in the central areas of the St. Louis and Kansas City metropolitan areas and along the Missouri and Mississippi rivers.

Per the 2020 NEI, Total VOC point source emissions were around 15,000 tons.

9.3.3 Area Source (non-mobile) Emissions

NO_x area source emissions are shown in Figure 7-5. VOC area source emissions and ozone monitoring sites are shown in Figure 9-11. The emission data on these maps is based on information from the 2020 NEI.

The highest VOC area source emissions are found south and east of the I-44 corridor and in the St. Louis and Kansas City areas. The high NO_x area source emissions are relatively high in the urban areas. NO_x area sources generally correlate with population density (see Section 2.0). Per the 2020 NEI, estimated area source emissions of VOCs totaled about 1.3 million tons per year.

9.3.2 Mobile Source Emissions

Figures 5-7 and 5-8 show traffic counts in the St. Louis and Kansas City areas. This information is used as a surrogate for mobile source emissions of both NO_x and VOCs. As shown in the figures, the central areas of the metropolitan areas contain some of the most traveled segments of traffic arteries and major interstate highways. It would, therefore, be expected that these areas have high levels of mobile emissions.

NO_x mobile source emissions are shown in Figure 7-6. VOC area source emissions and ozone monitoring sites are shown in Figure 9-12. The emission data on these maps is based on information from the 2020 NEI. The maps agree with the high traffic counts in Figures 5-7 and 5-8.

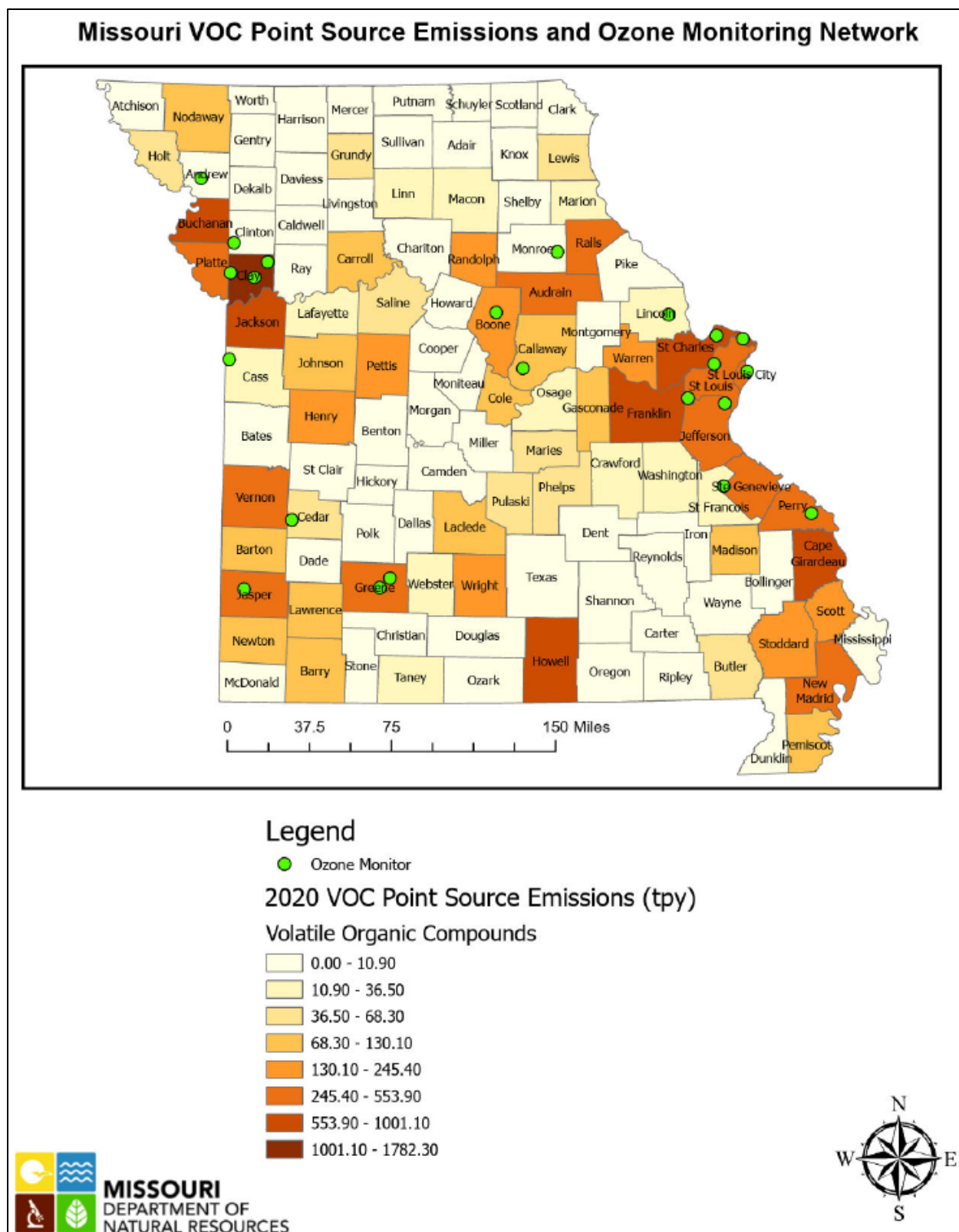


Figure 9-10. 2020 Missouri Statewide VOC Point Source Emissions and the 2025 Ozone Monitoring Network

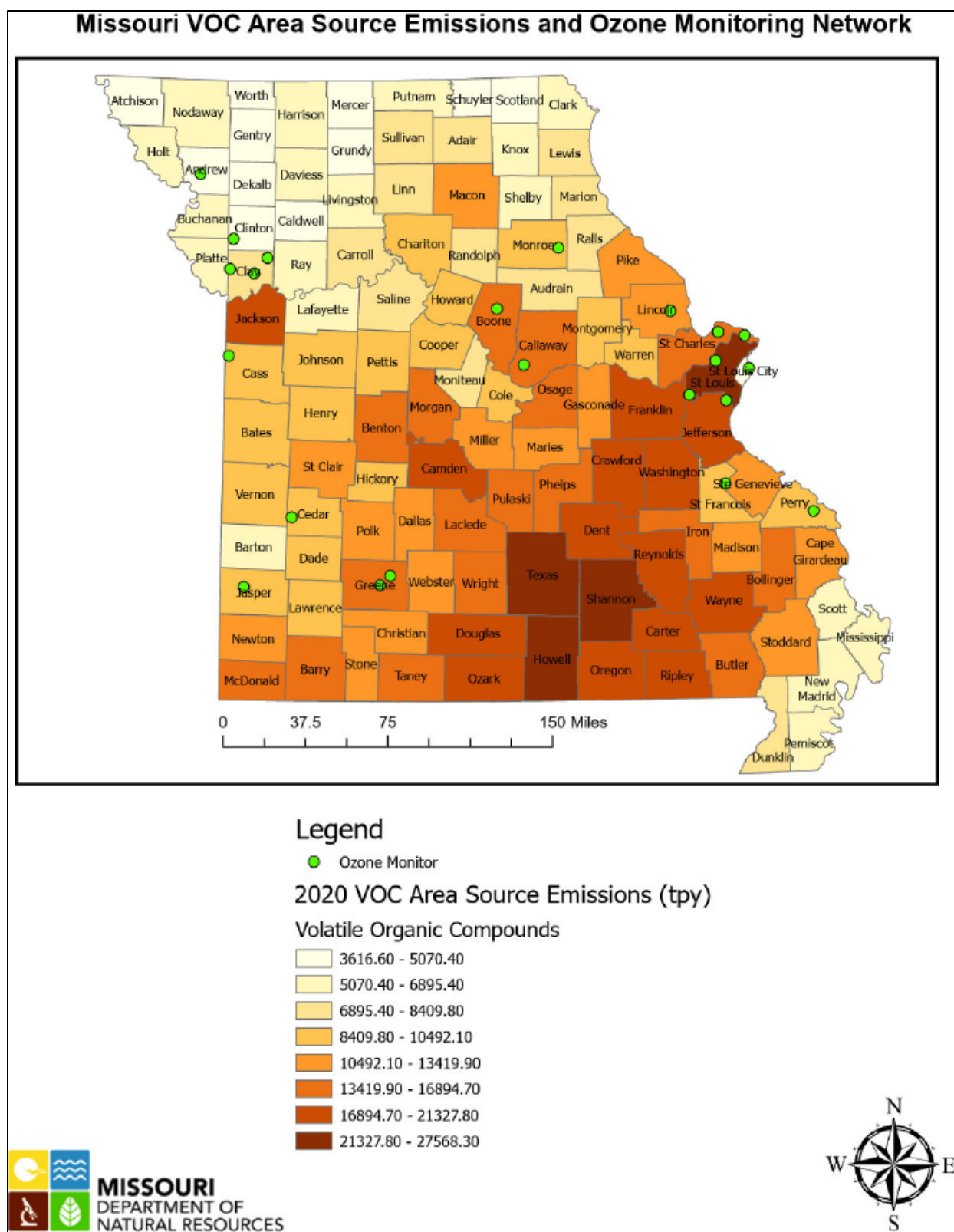
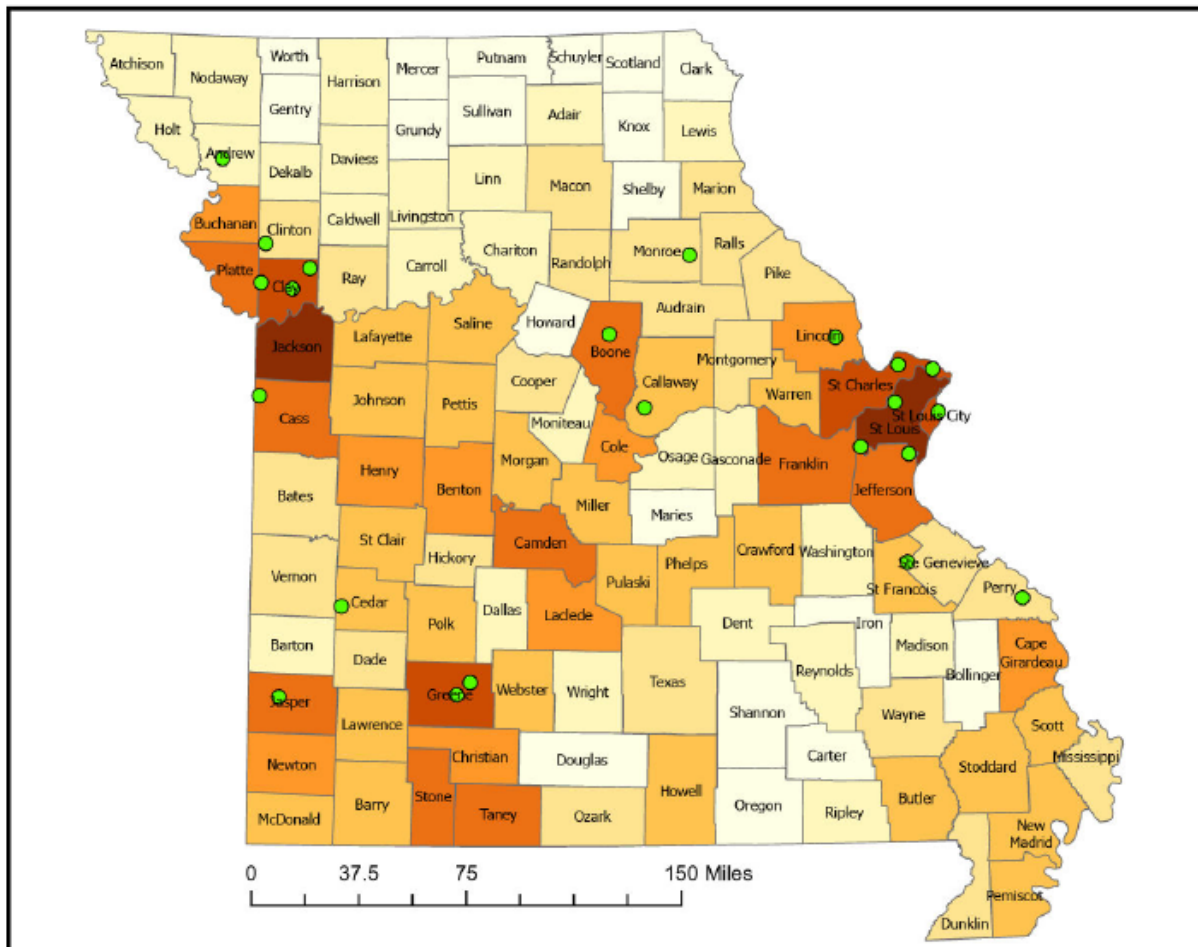


Figure 9-11. 2020 Missouri Statewide Area Source VOC Emissions and the 2025 Ozone Monitoring Network

Missouri VOC Mobile Source Emissions and Ozone Monitoring Network

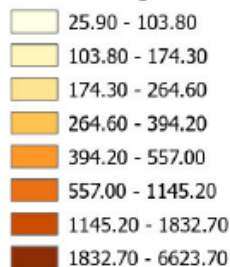


Legend

● Ozone Monitor

2020 VOC Mobile Source Emissions (tpy)

Volatile Organic Compounds



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES



Figure 9-12. 2020 Missouri Statewide Mobile Source VOC Emissions and the 2025 Ozone Monitoring Network

9.4. Evaluation of O₃ Monitoring Sites

St. Louis Area

The following O₃ monitoring sites in the St. Louis area are considered critical:

- Arnold West violated the O₃ NAAQS for the most recent three-year period (2021 to 2023) and is generally upwind of the St. Louis urban core, and is therefore critical in determining regional background for the St. Louis area.
- Blair St. violated the O₃ NAAQS for the most recent three-year period (2021 to 2023), is an NCore site, and is a PAMS site.
- Foley West is located downwind, but at a greater distance from the core of the metropolitan area and is therefore critical in helping to define the extent of nonattainment of the standard.
- Maryland Heights violated the O₃ NAAQS for the most recent three-year period (2021 to 2023) and is critical to ensure the maximum O₃ concentration is measured.
- Orchard Farm is critical to ensure the maximum O₃ concentration is measured.
- Pacific is generally upwind of the St. Louis urban core and is therefore critical in determining regional background for the St. Louis area.
- West Alton violated the O₃ NAAQS for the most recent three-year period (2021 to 2023) and has historically been the design value site for the area and is therefore critical.

All of these sites are therefore critical despite some correlation between some sites as discussed above.

From Table 9-1, the required number of sites in the St. Louis area is two, so that the existing network more than meets this requirement.

Kansas City Area

As discussed above and shown in Table 9-2 and Figure 9-3, with the exception of Rocky Creek, all of the sites in the Kansas City area were within the standard for the most recent three-year period (2021 to 2023). However, Trimble, Watkins Mill, and Liberty have violated the standard in the past, and all four of these sites, located north and generally downwind of central Kansas City, have measured similar concentrations. Therefore, all four of these sites are critical in measuring the maximum O₃ concentrations in the Kansas City area and defining the extent of potential exceedance of the standard if the standard is made more stringent.

The Richards Gebaur-South site, located generally upwind of the central Kansas City area, is critical in determining regional background for the Kansas City area.

From Table 9-1, the required number of sites in the Kansas City area is two, so that the existing network more than meets this requirement.

Remainder of the State

Alba, New Bloomfield, Finger Lakes and Savannah are critical sites, because they are located in MSAs of 50,000 to 350,000 people, (i.e., Joplin, Jefferson City, Columbia and St. Joseph, respectively), and have measured concentrations greater than 85% of the standard.

Hillcrest High School and Fellows Lake are located about 10 to 15 miles downwind of the Springfield urban core and have measured concentrations greater than 85% of the standard. Given the Springfield MSA is greater than 350,000 people and less than 4,000,000 people, the required number of sites in the Springfield area is two, so that both of these sites are critical.

Bonne Terre, Mark Twain State Park and El Dorado Springs are regional background sites for east, north-central and west Missouri respectively. These sites are critical in determining regional background

Farrar violated the O₃ NAAQS for the most recent three-year period (2021 to 2023) and is located generally downwind of in-state and out-of-state sources of NO_x and VOC that may impact the site. Therefore, the Farrar site is critical.

10.0 PM_{2.5} Network Assessment

10.1 Introduction: PM_{2.5} Standards and Monitoring Requirements

The level of the PM_{2.5} annual primary standard is 9 µg/m³. The level of the annual secondary standard is 15 µg/m³. The form of both annual standards is the annual mean averaged over three years. The level of the 24-hour primary and secondary standards is 35 µg/m³. The form of the 24-hour standards is the three-year average of the annual 98th percentile of 24-hour averages. The NAAQS are listed in the [EPA NAAQS Table](#) on the internet. The PM_{2.5} NAAQS were reviewed and proposed to not be changed in 2020.

Table 10-1 from 40 CFR, Part 58, Appendix D lists minimum PM_{2.5} monitoring requirements. Eighty-five percent of the annual primary standard is 7.65 µg/m³, and 85% of the 24-hour standard is 29.75 µg/m³.

Table 10-1. Minimum Numbers of PM_{2.5} Samplers Required		
MSA population^{1 2}	Most Recent 3-Year DV ≥ 85% of any PM_{2.5} NAAQS³	Most Recent 3-Year DV < 85% of any PM_{2.5} NAAQS^{3 4}
>1,000,000	3	2
500,000-1,000,000	2	1
50,000-<500,000 ⁵	1	0

¹Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).

²Population based on latest available census figures.

³The PM_{2.5} National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50.

⁴These minimum monitoring requirements apply in the absence of a design value.

⁵Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

Based on population information in Section 2.0, the first line of the table applies to the St. Louis and Kansas City MSAs, and the third line applies to the Springfield, Joplin, Columbia, Jefferson City, St. Joseph and Cape Girardeau MSAs.

In addition to the minimum numbers of sites in each MSA, each state must monitor at one regional background site and one regional transport site. Continuous PM_{2.5} monitors must be operated at a minimum of half of the required sites. For each distinct monitoring method (FRM or FEM) that is designated as a primary monitor, 15% of the primary monitors must have collocated monitors. The first collocated monitor must be a designated FRM monitor. Near-roadway PM_{2.5} monitoring is required at one location in each urban area (a core-based statistical area, or CBSA) with a population of 1 million or more.

10.2 PM_{2.5} Monitoring Results in Missouri

There are currently 15 sites that monitor PM_{2.5} in Missouri (Figure 10-1), including 13 sites for NAAQS compliance determination and two IMPROVE samplers (at Hercules Glades and

Mingo). It is important to note that the Mingo site was damaged by a tornado in March of 2025. Efforts are being made to repair the Mingo site; however, the continued operation of the site is uncertain at this time.

Six of the NAAQS compliance sites are in the St. Louis area, and four are in the Kansas City area. One site is in the Springfield area and one in the St. Joseph area. One site is in a rural area. There are also PM_{2.5} speciation samplers at Blair Street and Arnold West.

10.2.1 PM_{2.5} Design Values

PM_{2.5} design values for the past five years in Missouri as determined according to the annual NAAQS are listed in Table 10-2 and shown in Figure 10-2. PM_{2.5} design values determined according to the 24-hour NAAQS are listed in Table 10-3 and shown in Figure 10-3. All Missouri monitors have met the annual standard during this period, even though Branch Street is designated as a middle scale site, not to be compared to the annual NAAQS. All Missouri monitors have also met the 24-hour standard for all of the periods under consideration.

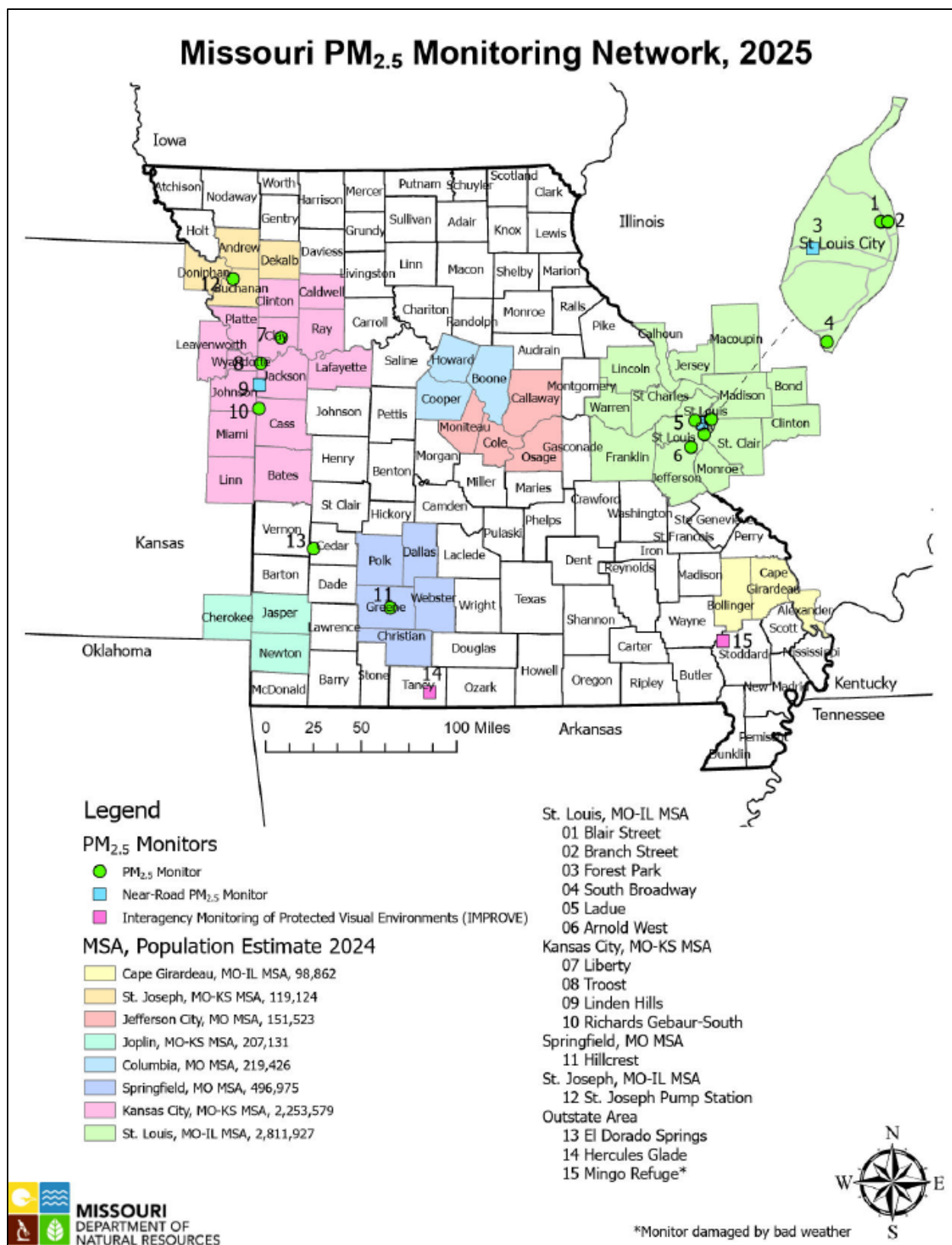


Figure 10-1. 2025 Missouri PM_{2.5} Monitoring Network

Table 10-2

24-Hour PM_{2.5} Design Values, µg/m³ (Annual 98th Percentile Concentration Averaged Over Three Consecutive Years.)^{1,2}					
Yellow Highlights Indicate Design Values Exceeded the 2006 Standard (35 µg/m³)					
Site Name	17-19	18-20	19-21	20-22	21-23
Arnold West	18	18	19	19	20
Blair Street	20	22	22	21	22
Blue Ridge, I-70	17	17	18	19	
Branch Street	20	21	21	21	22
El Dorado Springs	17	17	18	18	19
Forest Park	20	22	22	21	22
Hillcrest High School	16	16			
Ladue	20	21	20	19	18
Liberty	15	15	17	16	17
Linden Hills					
Richard Gebaur-South	16	15	16	16	
South Broadway	19	20	20	19	18
St. Joseph Pump Station	18	18	19	19	21
Troost	18	17	19	19	20

¹ Blue Ridge, I-70 was Discontinued in 2023 Due to Vandalism.

² Linden Hills was Added in 2025 as Near Road Site to Replace Blue Ridge, I-70.

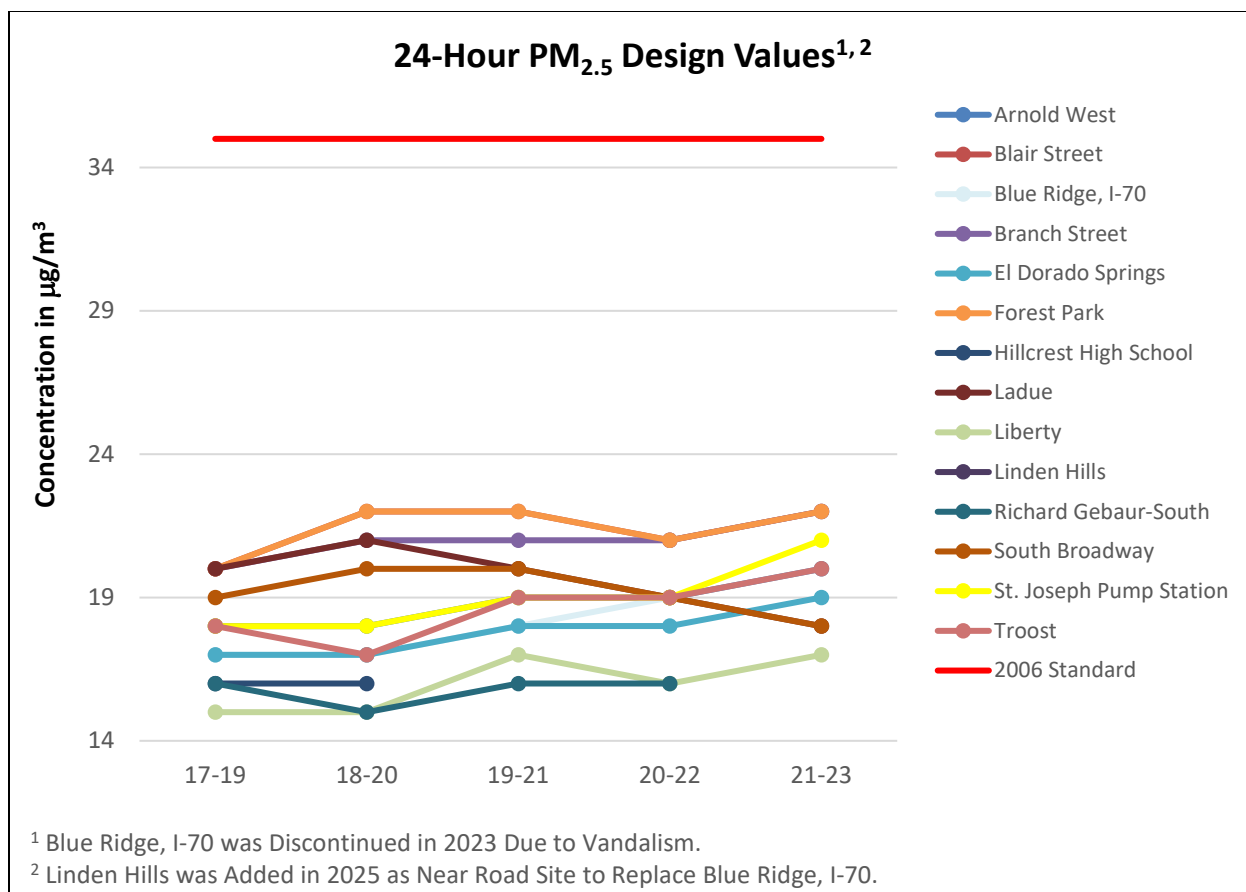


Figure 10-2. 24-hour PM_{2.5} Design Values

Table 10-3

Annual PM _{2.5} Design Values, µg/m ³ (Annual Mean Concentration Averaged Over Three Consecutive Years) ^{1, 2, 3}					
Yellow Highlights Indicate Design Values Exceeded the 2024 Standard (9 µg/m ³)					
Site Name	17-19	18-20	19-21	20-22	21-23
Arnold West	7.3	7.1	7.4	8.0	8.2
Blair Street	8.6	8.8	9.0	8.6	9.6
Branch Street					
Forest Park	8.7	8.9	9.2	8.9	9.0
Ladue	9.3	8.6	7.9	7.0	7.2
South Broadway	8.5	8.4	7.8	7.3	7.2
Blue Ridge, I-70	7.9	7.8	7.9	7.9	
El Dorado Springs	7.2	7.1	7.2	6.7	6.8
Liberty	6.3	6.1	6.2	6.0	6.0
Linden Hills					
Richard Gebaur-South	6.5	6.3	6.5	6.3	
Troost	8.0	7.0	7.0	7.1	7.6
Hillcrest High School	7.4	7.5			
St. Joseph Pump Station	8.6	8.4	8.2	8.1	8.6
¹ Branch Street is a Middle Scale Monitor Not to be Compared to the Annual Standard.					
² Blue Ridge, I-70 was Discontinued in 2023 Due to Vandalism.					
³ Linden Hills was Added in 2025 as Near Road Site to Replace Blue Ridge, I-70.					

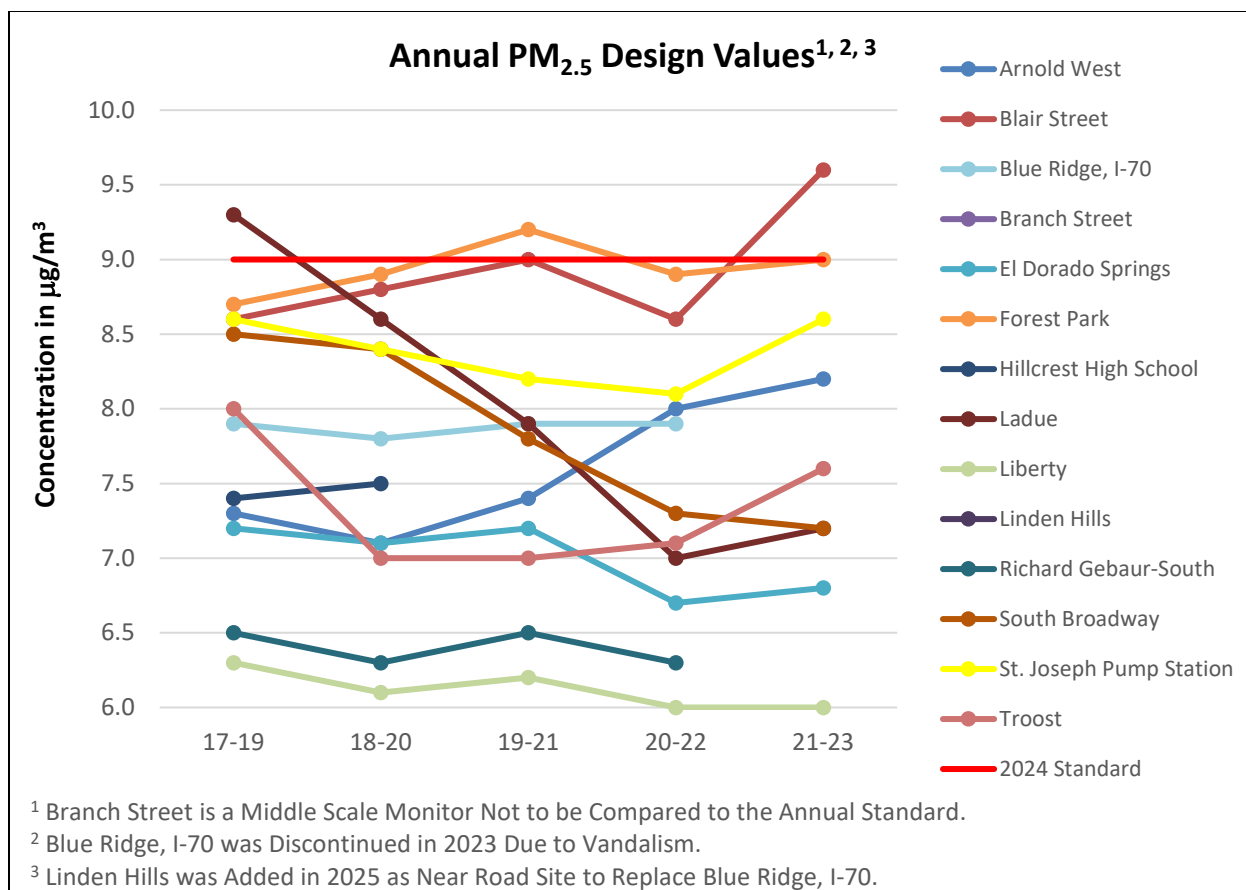


Figure 10-3. Annual PM_{2.5} Design Values

10.2.2 Application of Ambient Air Monitoring Assessment Tools

The ambient air monitoring assessment tools described in Section 9.2.2 were applied to the PM_{2.5} network using data through 2023.

Correlation Matrices

The correlation matrix tool generates a display that summarizes the correlation, relative difference and distance between pairs of monitoring sites. The numbers in the boxes below the diagonal in each matrix are the number of observations used in each correlation between two sites. The intensity of the shading represents the Pearson correlation for each pair of sites, with the darker shading indicating the weakest correlation. The numbers in the boxes above the diagonal are the distances in kilometers between the two sites. The intensity of the shading represents the mean absolute difference in ppm between each pair of site, with the darker shading indicating the greatest difference. The number in each diagonal box is the 2021 to 2023 design value for each site.

Figure 10-4 shows the correlation matrix for sites in the St. Louis area. The slightly darker red shading along the Branch Street site comparisons indicates a higher mean difference in concentrations compared with sites that are fairly close. The darker blue shading associated with the Illinois sites (especially Gateway RMC) indicates they are less well correlated with each

other. Arnold west on the Missouri side also shows some low correlation with sites closer to the urban core.

Figure 10-5 shows the correlation matrix for sites in the Kansas City area. The Troost site is slightly less well correlated with the other sites than they are with each other, possibly because of its location in the urban core.

Removal Bias

As described in Section 9.2.2, blue indicates negative removal bias (the concentration would be underestimated if the site were removed), red indicates positive removal bias (the concentration would be overestimated if the site were removed), and the intensity of the color indicates the magnitude of the removal bias.

Figure 10-6 shows the removal bias for sites in the St. Louis area. Among Missouri sites, the bias is highest (negative) at Forest Park and lowest (positive) at South Broadway.

Figure 10-7 shows the removal bias for Kansas City area sites. Of the Missouri sites, Troost show a high negative bias, and Liberty and Richards Gebaur-South shows a high positive bias. Note that Linden Hills, the near-road replacement site for Blue Ridge is indicated by a green dot and was not collecting data during the 2021-2023 period.

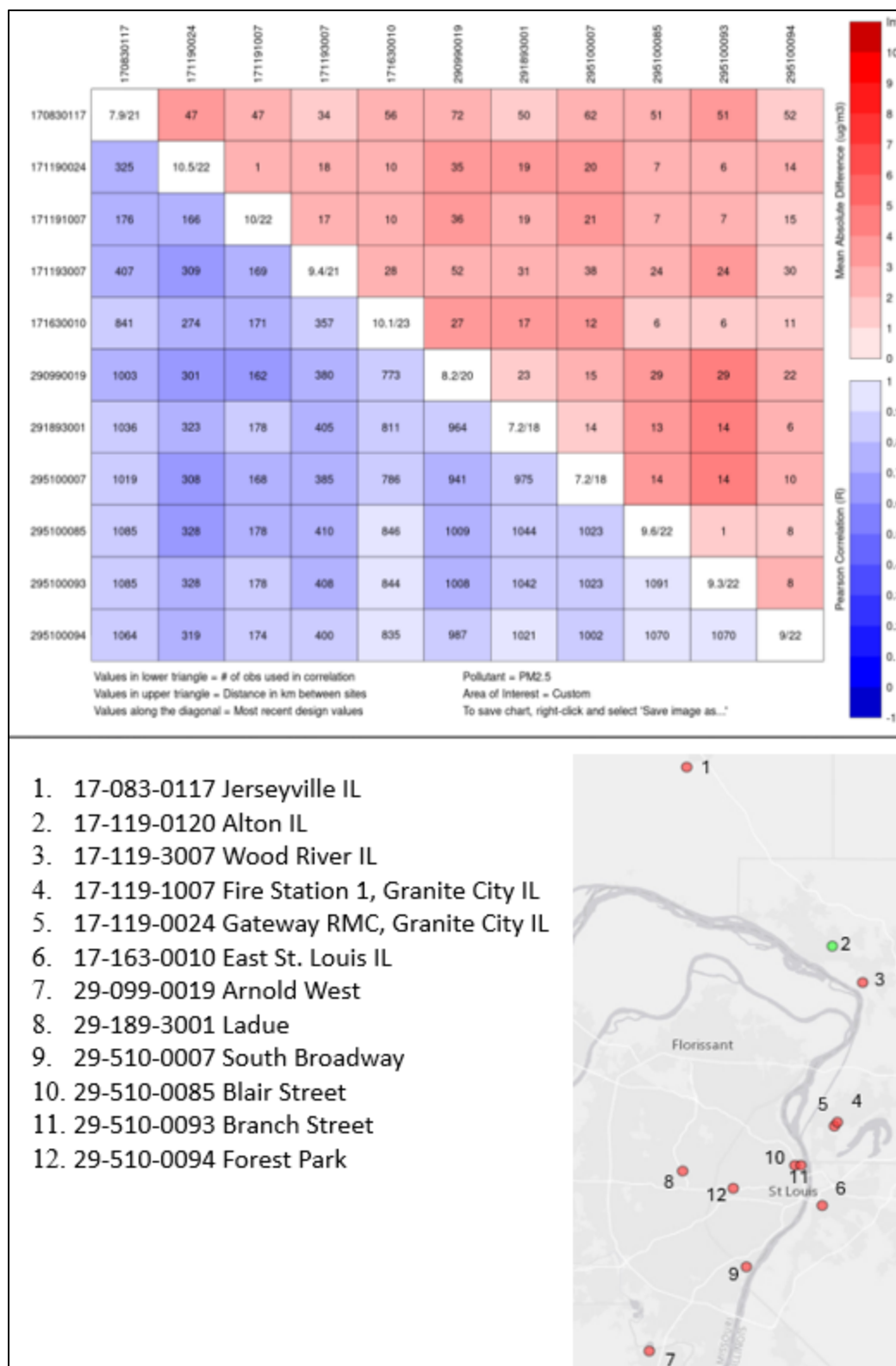


Figure 10-4. Correlation Matrix for St. Louis Area PM_{2.5} Sites

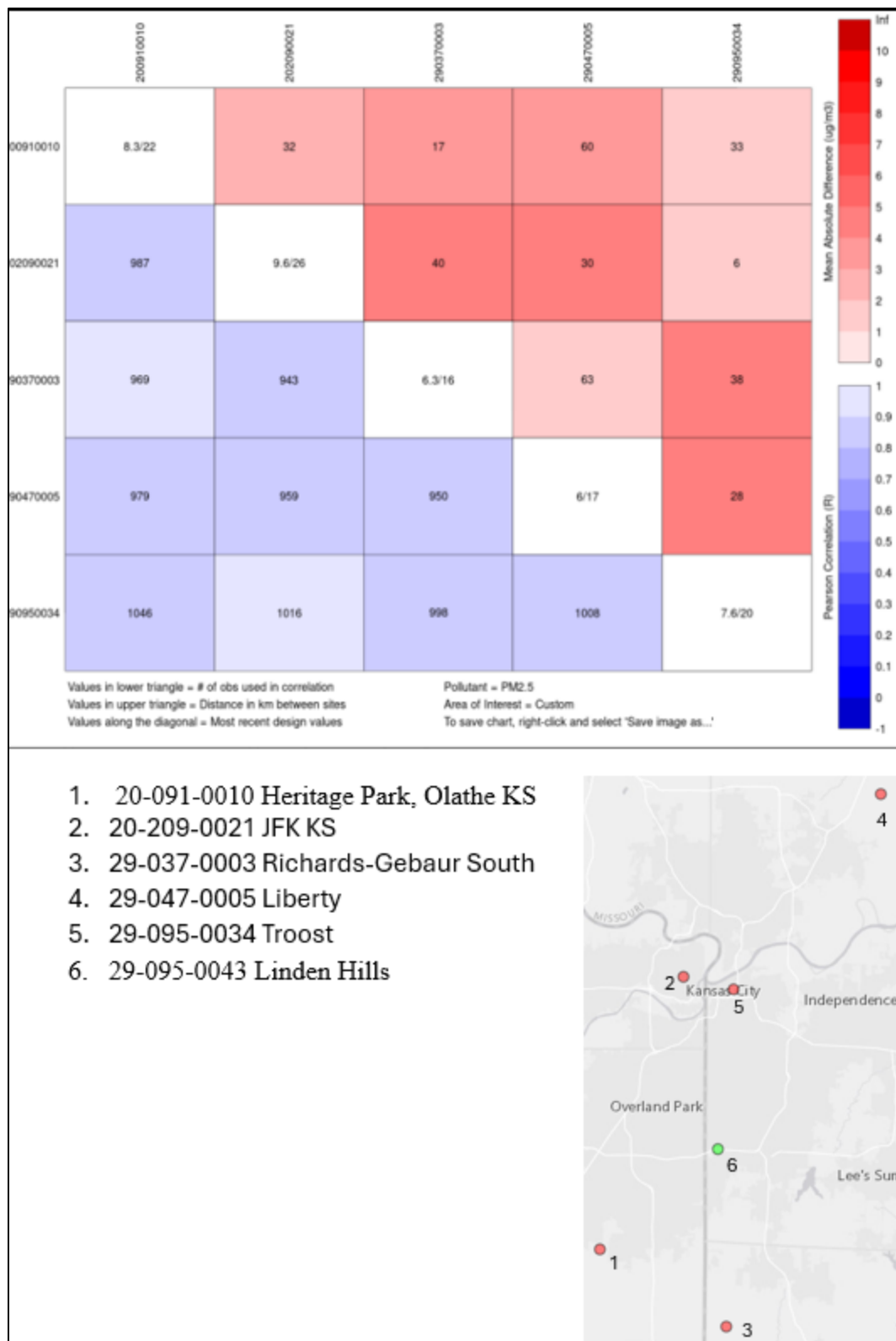


Figure 10-5. Correlation Matrix for Kansas City Area PM_{2.5} Sites

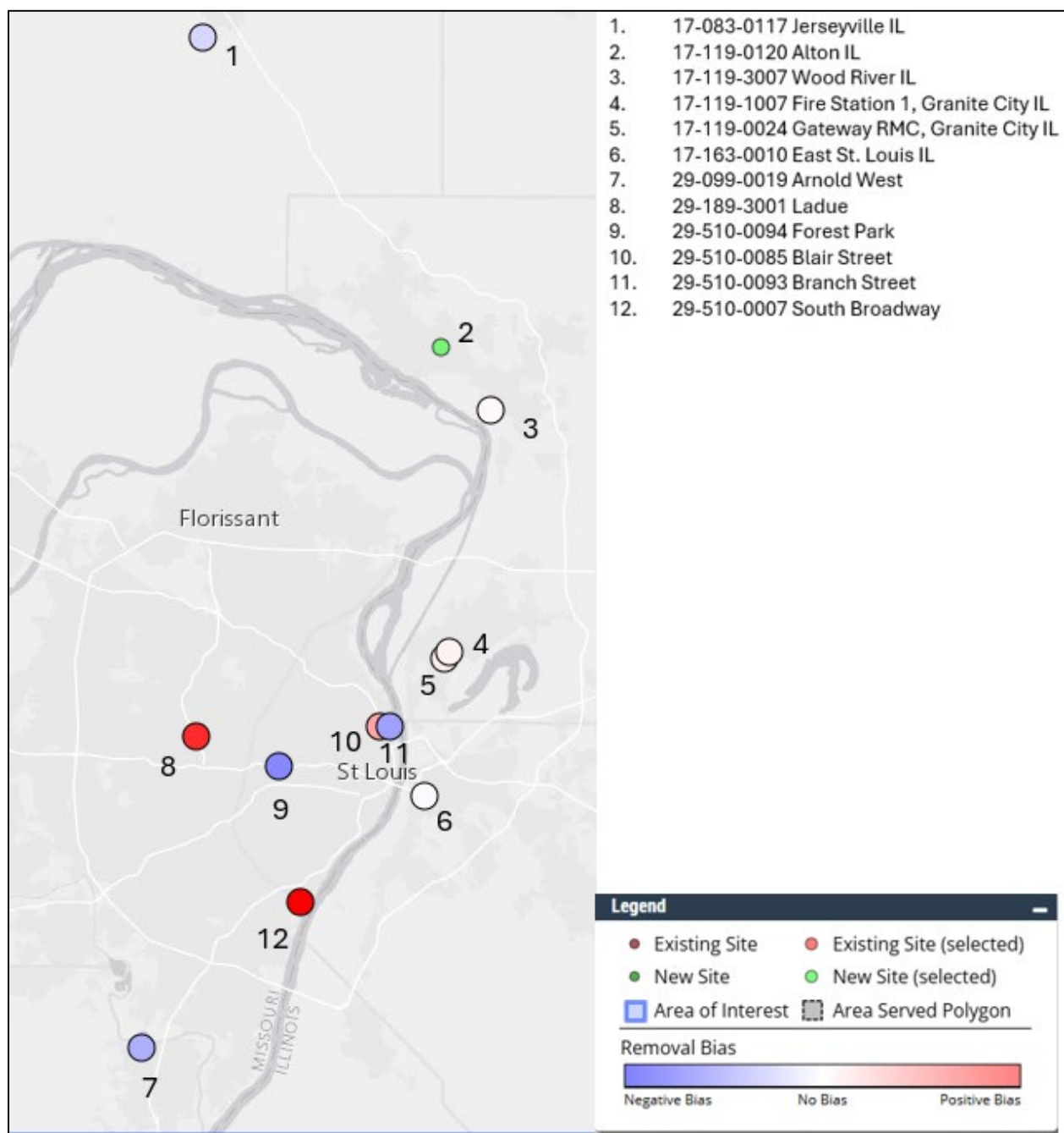


Figure 10-6. Removal Bias for St. Louis Area PM_{2.5} Sites

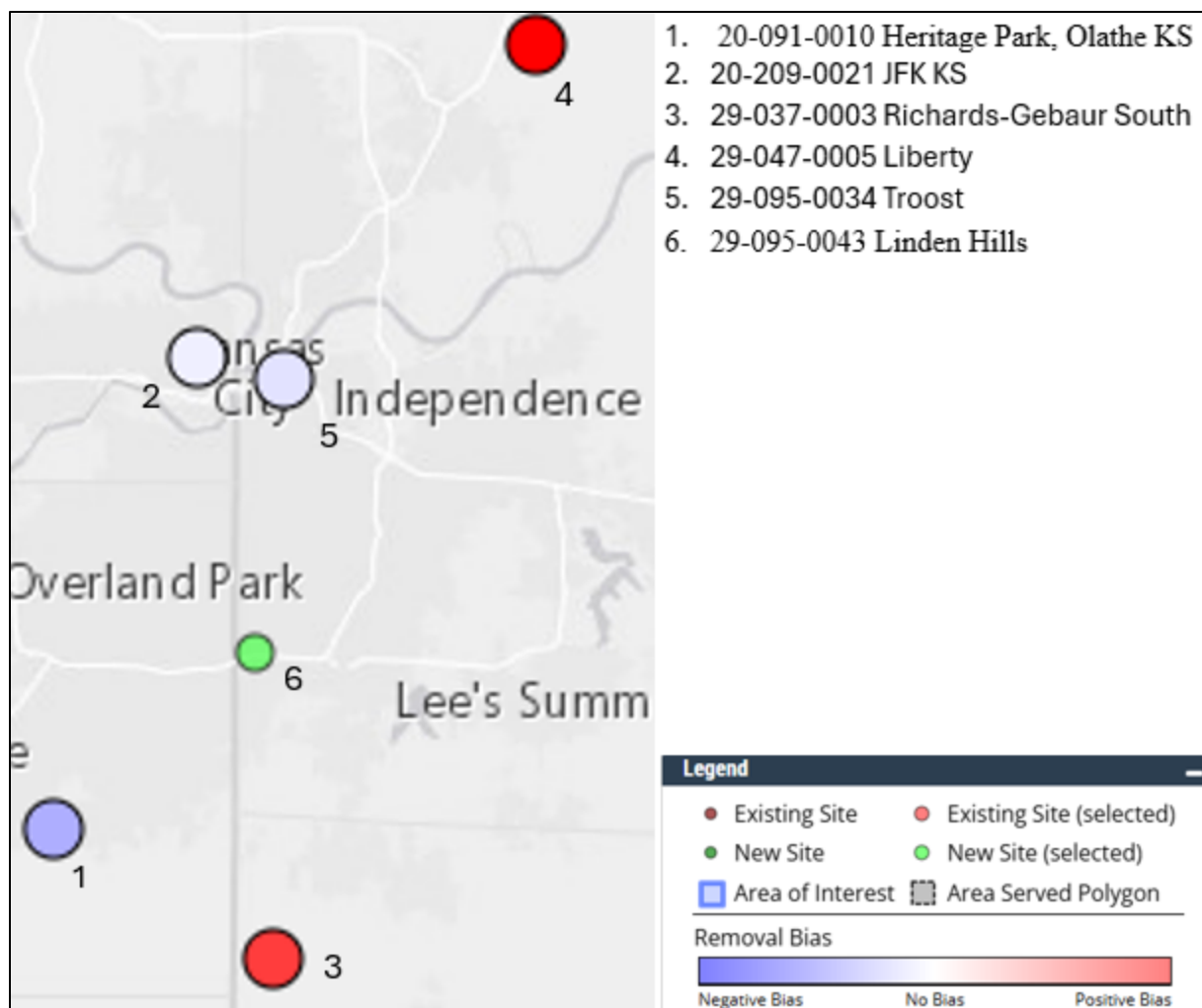


Figure 10-7. Removal Bias for Kansas City Area PM_{2.5} Sites

10.3 PM_{2.5} and Precursor Emissions

Fine particulate matter is chiefly composed of the effluent from combustion processes taking place in fossil fuel-fired power plants, transportation, industry, agriculture, construction, waste disposal and other sectors. In addition to the primary PM_{2.5} directly emitted from these processes, the majority of airborne PM_{2.5} is secondary, formed downstream from emission points by the condensation of sulfur and nitrogen oxides (SO_x and NO_x), volatile organic compounds (VOC) and ammonia (NH₃) emitted by these same processes. The same sources that emit PM_{2.5} and its precursors are largely responsible for emissions of the VOC and NO_x that cause the formation of ozone as well. Therefore, in addition to direct PM_{2.5} emission sources, sources of PM₁₀, SO_x, NO_x, VOC, and NH₃ also contribute to atmospheric PM_{2.5}.

PM_{2.5} speciation results in the St. Louis area indicate the species contributing most of the PM_{2.5} mass are ammonium sulfate, ammonium nitrate and carbonaceous material (organic compounds and elemental carbon). The highest contribution year-round is the carbonaceous material. The sulfate and nitrate contributions vary seasonally, with sulfate higher in the summer and nitrate higher in the winter. Both carbonaceous material and nitrate are indicators of combustion sources.

Comparison of PM_{2.5} mass and speciation measurement results for the St. Louis area to results for rural areas shows an urban excess of 2.5 to 3 µg/m³, which (on an annual basis) is predominantly carbonaceous material (organic compounds and elemental carbon) with a smaller contribution of nitrate. Sulfate is only a minor contributor to the urban excess, suggesting that it results primarily from regional sources such as coal combustion sources in the general area along the Ohio River. The sulfate contribution to PM_{2.5} in St. Louis is less than it was several years ago, suggesting that emission controls and/or changes in fuel have reduced regional sulfur dioxide emissions.

Airborne PM_{2.5} in the St. Louis area is dominated by the impact of regional or urban-scale influences and by the contribution of secondary sources, and large SO_x and NO_x sources generally have tall stacks that reduce their near-source impact. However, it is still worthwhile to consider the location of emission sources, in order to help ascertain that source influences are not being either overlooked or overemphasized because of the location of monitoring stations.

Figures 10-8, 10-9, and 10-10 display county-by-county PM_{2.5} emissions based on 2020 NEI data for point, area (non-mobile), and mobile source emissions, respectively. The locations of SO₂, NO_x, and VOC sources are shown in other sections of this assessment. Direct PM_{2.5} emissions from point sources, area sources (non-mobile), and mobile sources are around 7,000 tons, 195,000 tons, and 5,000 tons, respectively. Unpaved road dust, crop/livestock dust, and prescribed fires make up over 150,000 tons of the total, or around 74%.

Figures 10-11, 10-12, and 10-13 display county-by-county ammonia emissions based on 2020 NEI data for point, area (non-mobile), and mobile source emissions, respectively. Area source agricultural activities make up around 90% of the total ammonia emissions in Missouri with around 160,000 tons emitted in 2020.

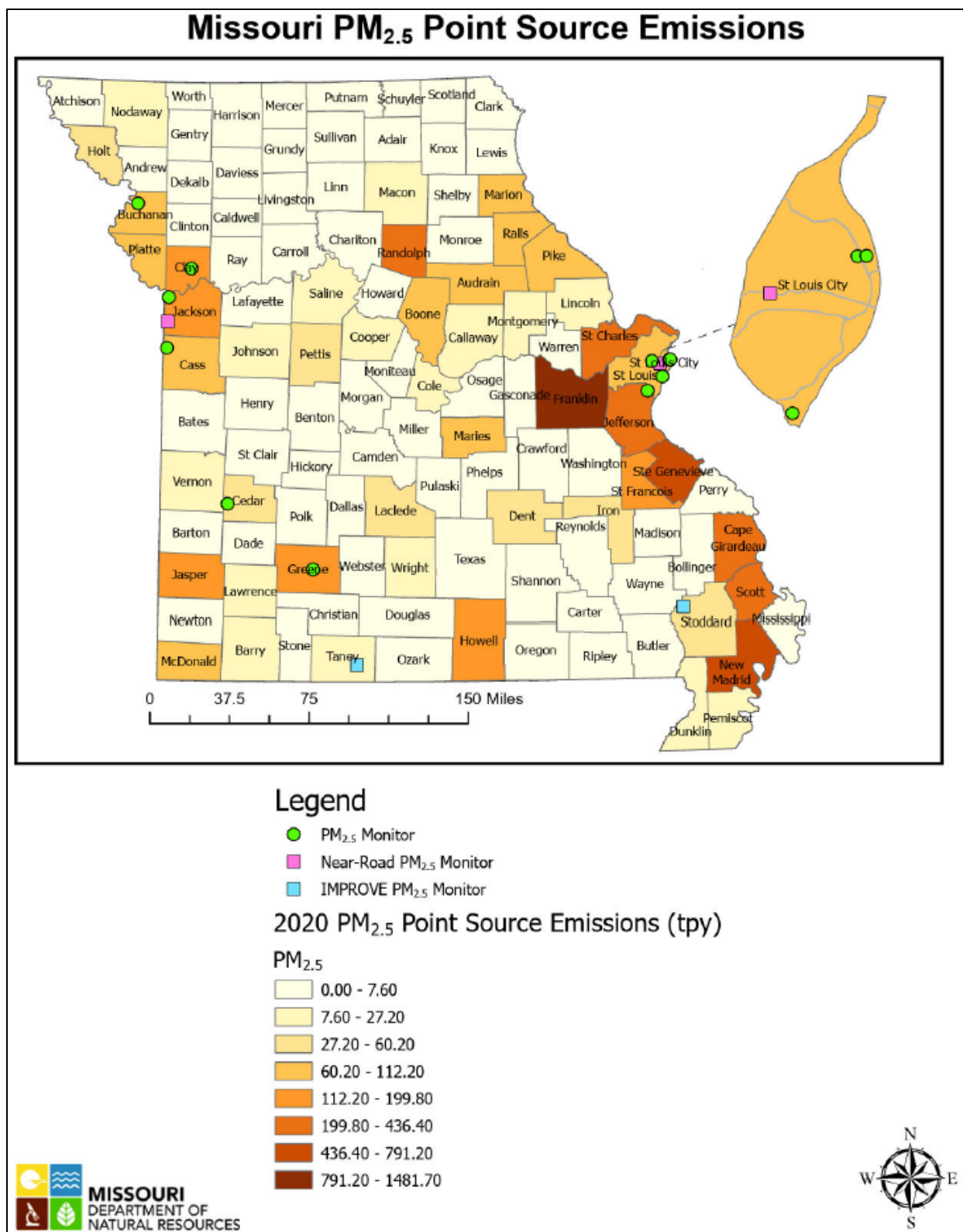
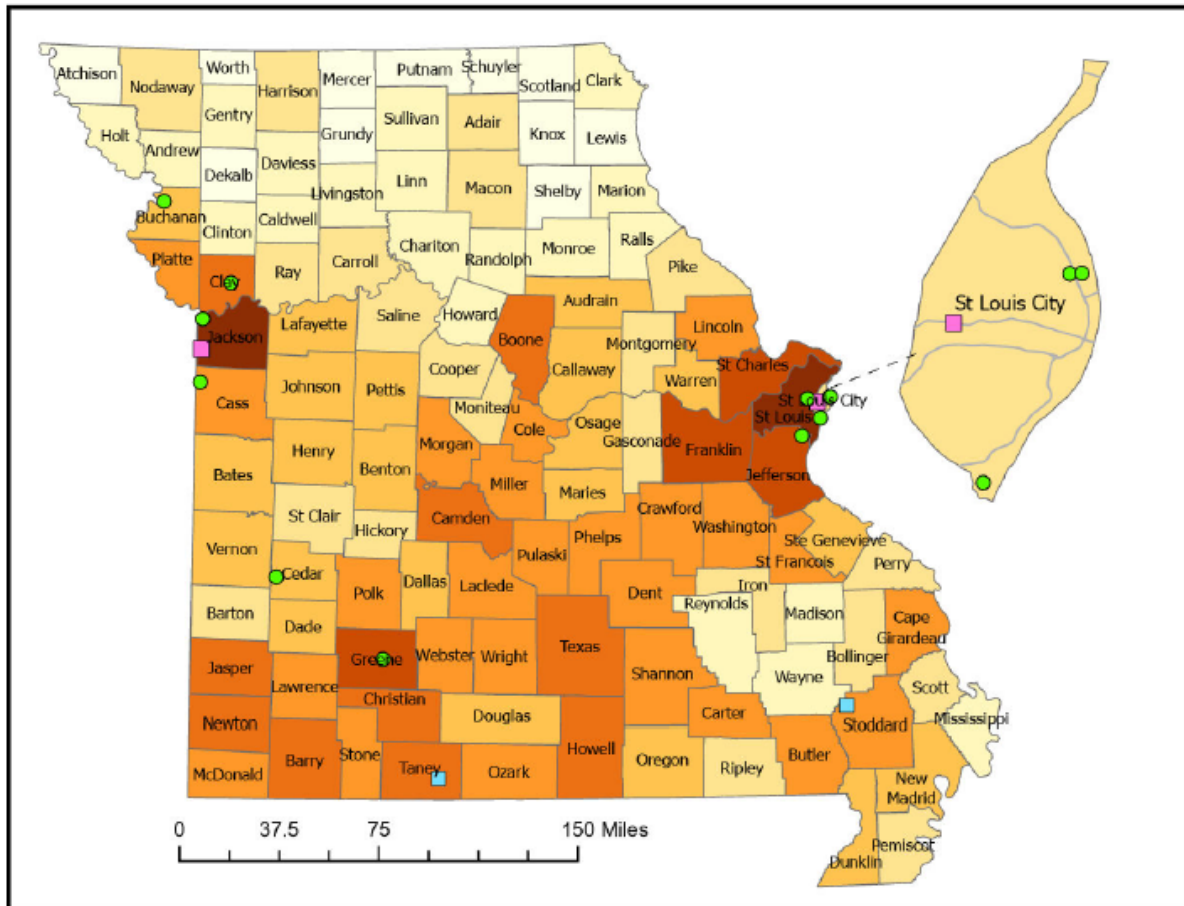


Figure 10-8. 2020 Statewide PM_{2.5} Point Source Emissions and the 2025 PM_{2.5} Monitoring Network

Missouri PM_{2.5} Area Source Emissions



Legend

- PM_{2.5} Monitor
- Near-Road PM_{2.5} Monitor
- IMPROVE PM_{2.5} Monitor

2020 PM_{2.5} Area Source Emissions (tpy)

PM_{2.5}

- 333.20 - 622.80
- 622.80 - 940.60
- 940.60 - 1247.00
- 1247.00 - 1710.80
- 1710.80 - 2420.80
- 2420.80 - 3472.90
- 3472.90 - 5260.30
- 5260.30 - 9793.00



Figure 10-9. 2020 Statewide PM_{2.5} Area Source (Non-Mobile) Emissions and the 2025 PM_{2.5} Monitoring Network

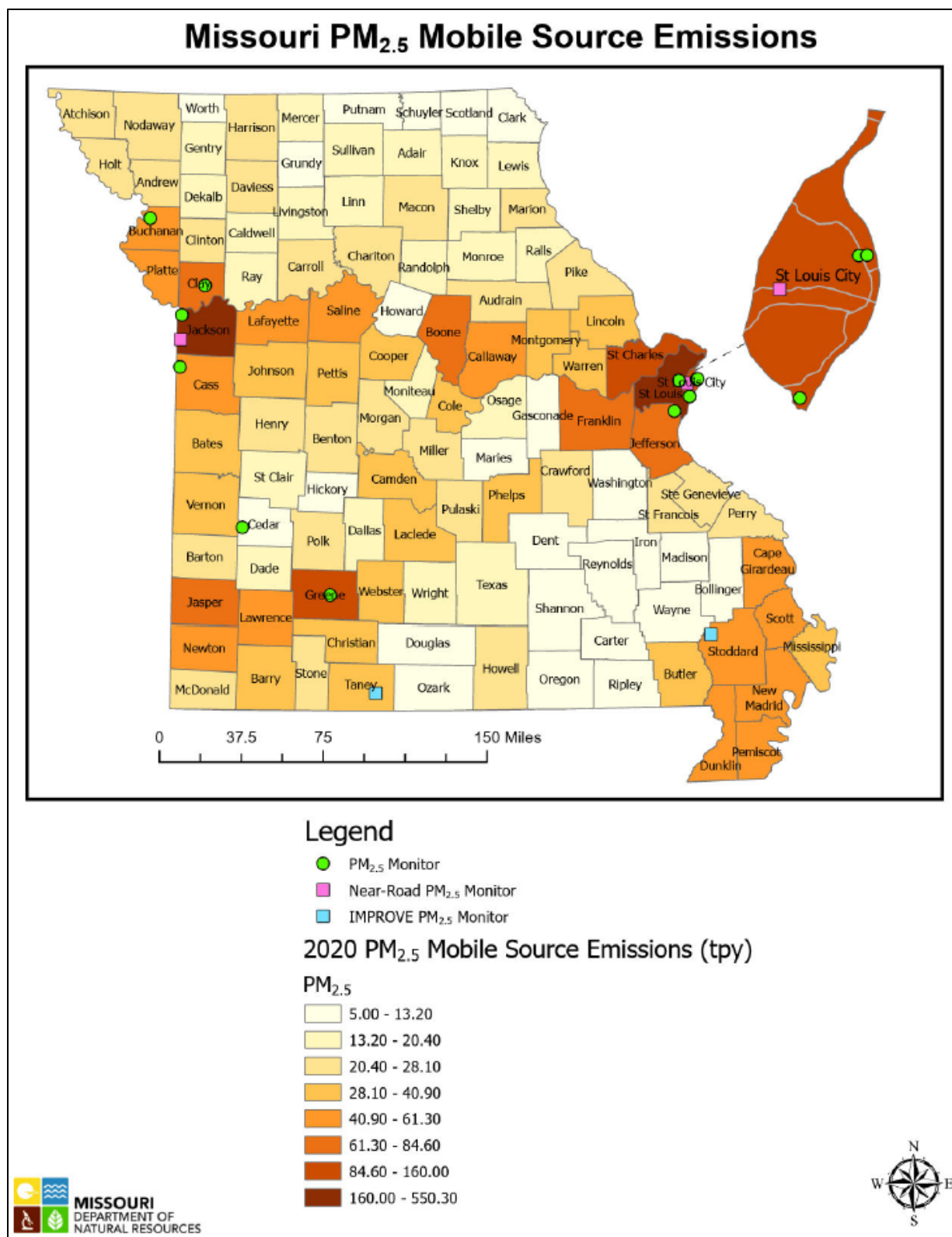
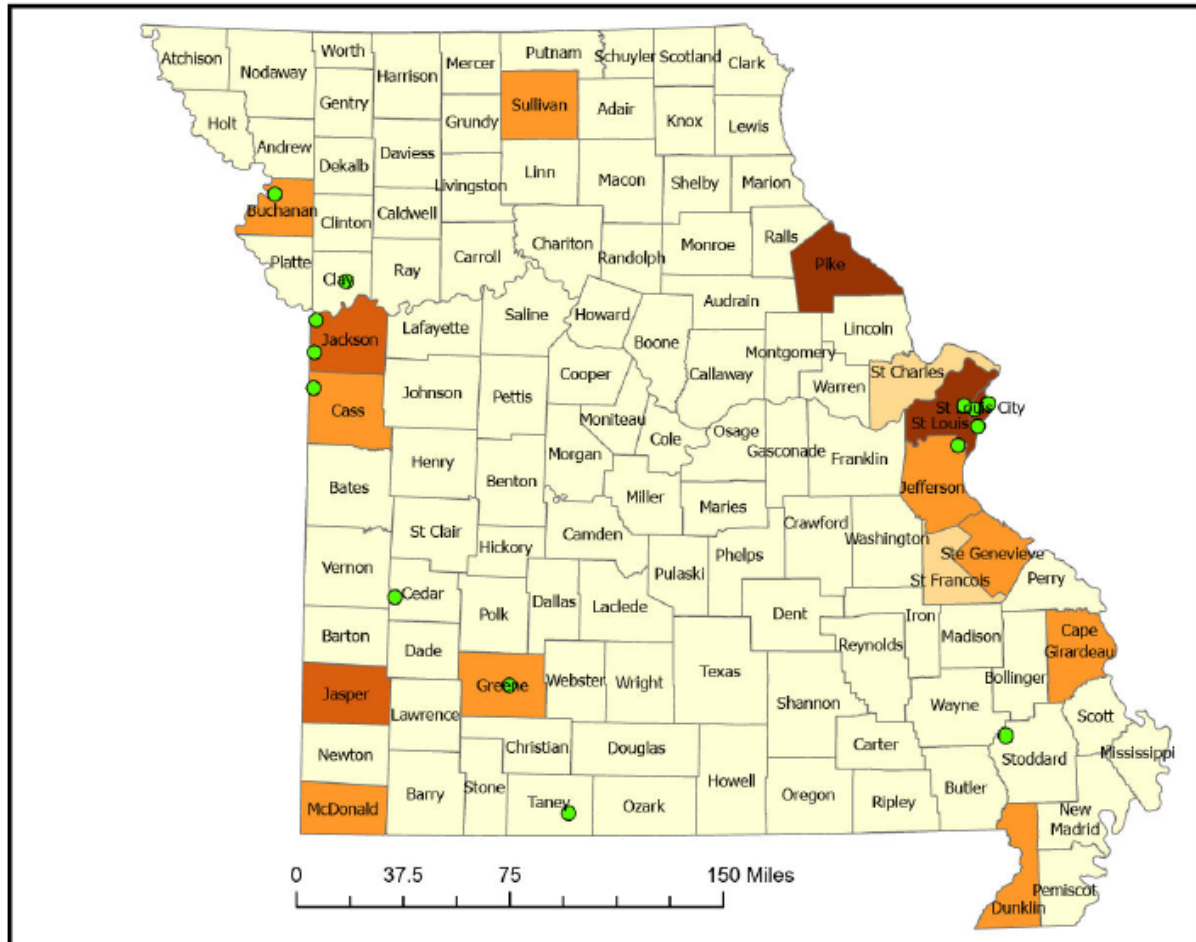


Figure 10-10. 2020 Statewide PM_{2.5} Mobile Source Emissions and the 2025 PM_{2.5} Monitoring Network

Missouri Ammonia Point Source Emissions and PM_{2.5} Monitoring Network



Legend

● PM_{2.5} Monitor

2020 Ammonia Point Source Emissions (tpy)

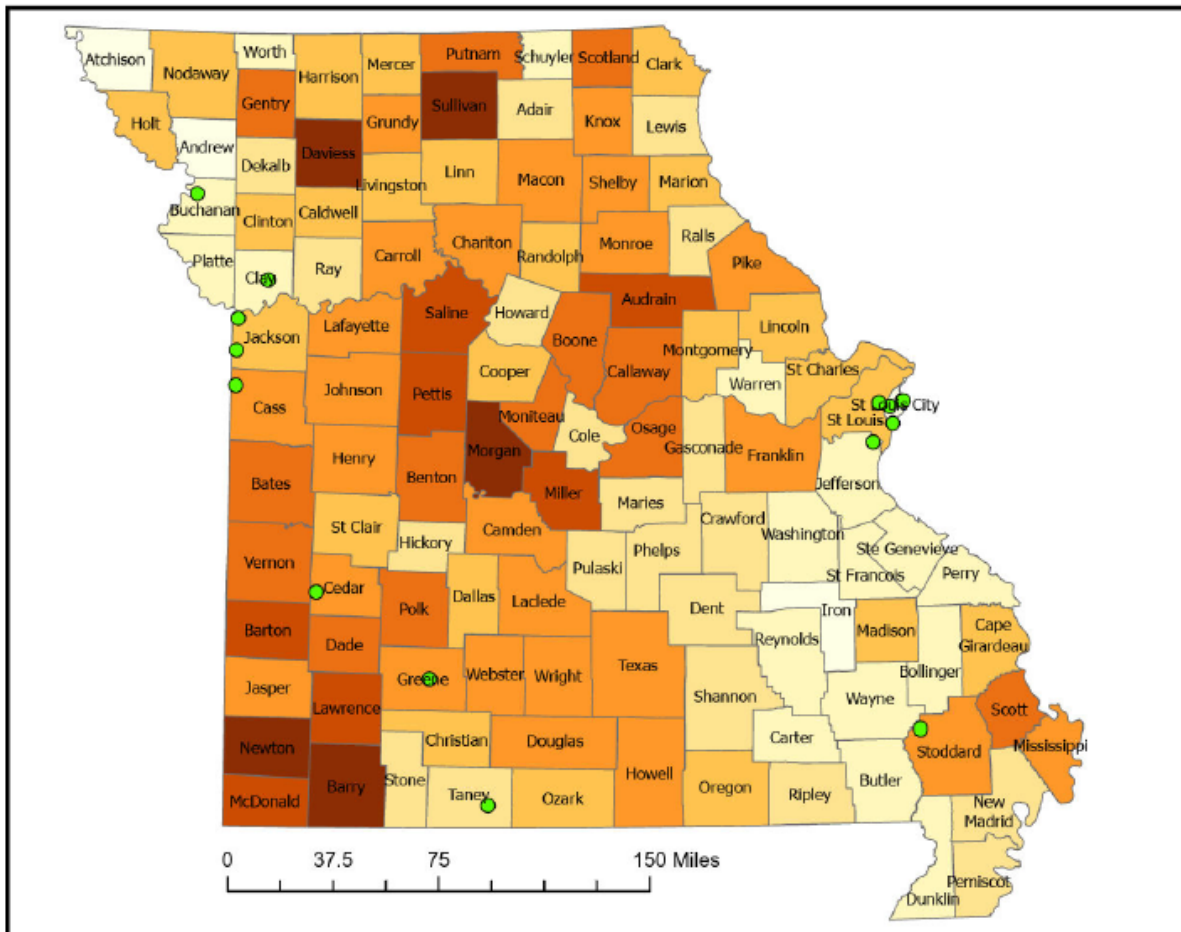
Ammonia

- 0.00 - 0.80
- 0.80 - 3.00
- 3.00 - 7.40
- 7.40 - 17.20
- 17.20 - 36.80
- 36.80 - 99.30
- 99.30 - 234.60
- 234.60 - 513.70



Figure 10-11. Statewide Ammonia Point Source Emissions for 2020 and the 2025 PM_{2.5} Monitoring Network

Missouri Ammonia Area Source Emissions and PM_{2.5} Monitoring Network



Legend

● PM_{2.5} Monitor

2020 Ammonia Area Source Emissions (tpy)

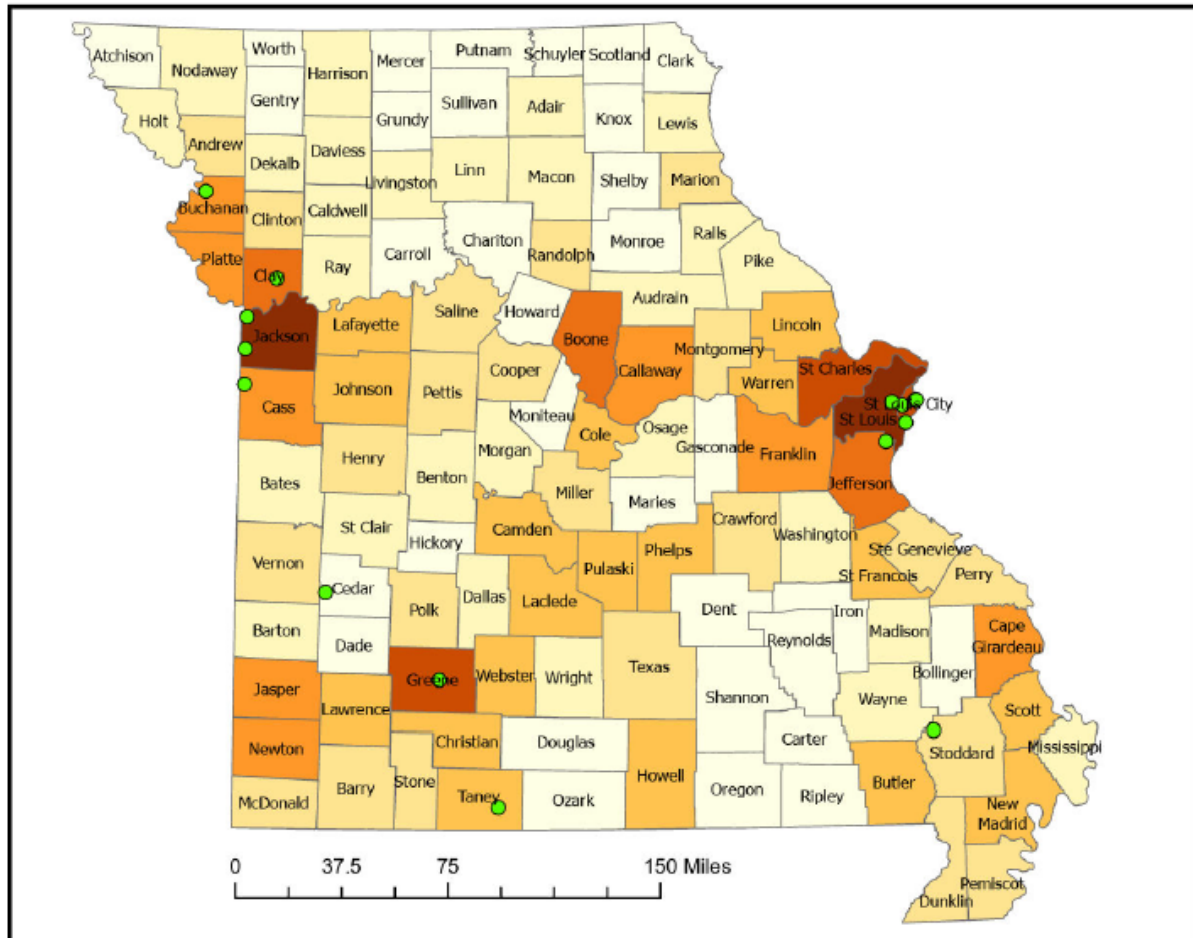
Ammonia

139.60 - 482.40
482.40 - 815.40
815.40 - 1035.60
1035.60 - 1365.70
1365.70 - 1941.00
1941.00 - 2503.50
2503.50 - 3383.70
3383.70 - 5058.00



Figure 10-12. Statewide Ammonia Area Source (Non-Mobile) Emissions for 2020 and the 2025 PM_{2.5} Monitoring Network

Missouri Ammonia Mobile Source Emissions and PM_{2.5} Monitoring Network



Legend

● PM_{2.5} Monitor

2020 Ammonia Mobile Source Emissions (tpy)

Ammonia

- 0.70 - 5.50
- 5.50 - 9.80
- 9.80 - 16.00
- 16.00 - 26.50
- 26.50 - 46.00
- 46.00 - 82.40
- 82.40 - 119.00
- 119.00 - 327.40



Figure 10-13. Statewide Ammonia Area Source (Non-Mobile) Emissions for 2020 and the 2025 PM_{2.5} Monitoring Network

10.4 Evaluation of the PM_{2.5} Monitoring Network

All of the 24-hour PM_{2.5} design values are less than 85% (29.75 µg/m³) of the standard.

For the annual standard, the highest applicable St. Louis area design value is 9.6 µg/m³ (Blair Street), and the highest Kansas City area design value is 7.6 µg/m³ (Troost). The Blair Street design value is greater than 85% (7.65 µg/m³) of the standard and the Troost site does not exceed 85% of the standard. Therefore, based on Table 10-1, a minimum of three PM_{2.5} sites is required in the St. Louis area and two PM_{2.5} sites are required in the Kansas City area. It is important to note that the 2020 – 2022 design value at Blue Ridge, I-70 exceeded 85% of the standard in the Kansas City area. If that site had still been in operation and continued to measure similar readings, three sites may be required.

The annual design value at the Hillcrest High School site in Springfield is less than 85% of the standard and as a result, no site is required based on Table 10-1. The St. Joseph site is greater than 85% of the standard, so one site required based on Table 10-1.

Table 10-4 summarizes the required numbers of PM_{2.5} monitoring sites based on Table 10-1 and the current numbers of sites. The required minimum numbers of sites are exceeded in each MSA.

Table 10-4. Required and Current Numbers of PM_{2.5} Monitoring Sites in Missouri

MSA	Required Minimum Number of PM_{2.5} Monitoring Sites	Current Number of PM_{2.5} Monitoring Sites in MSA within Missouri
St. Louis	3	6
Kansas City	2	4
Springfield	0	1
Joplin	0	0
Columbia	0	0
Jefferson City	0	0
St. Joseph	1	1
Cape Girardeau	0	0
(not in a MSA)	0	1

Continuous PM_{2.5} monitors must be operated at a minimum of half of the required sites (40 CFR Part 58, Appendix D). Continuous monitors are now being operated at all of the sites, and collocated FRM and FEM instruments are being operated at one site in the St. Louis area. Collocated FEM instruments are being operated at the St. Joseph site. Two collocated instruments at 13 sites meet the requirement for 15% collocation.

In addition to the minimum numbers of sites in each MSA, each state must monitor at one regional background site and one regional transport site. El Dorado Springs is a regional

background site in southwest Missouri. The Liberty site, generally downwind of Kansas City and the Alton IL site, generally downwind of St. Louis, provide regional transport information.

In addition to sites identified above, PM_{2.5} speciation samplers are located at Blair Street in St. Louis and Arnold West, a suburban site south of St. Louis. IMPROVE samplers (operated by other agencies) have historically been operated at the Mingo National Wildlife Refuge and Hercules Glades Wilderness; however, the Mingo site was damaged by a tornado in March of 2025. Efforts are being made to repair the Mingo site; however, the continued operation of the site is uncertain at this time.

In the St. Louis area, the Blair Street site is critical, in part because of its designation as an NCore site, and because of its location near the urban center and several large industrial sources. The Branch St. site is near the Blair Street site but is located in a significant PM emission source area, so is also critical. The South Broadway and Ladue sites are fairly well correlated but are 13 kilometers apart. The South Broadway site is more generally upwind of the central St. Louis area. Therefore, the South Broadway and Ladue sites are both judged as critical. The Arnold West site is an important suburban site, generally upwind of the central St. Louis area and also provides important speciation data so is judged to be critical. The Forest Park site is critical because PM_{2.5} monitoring collocated with near-road NO₂ monitoring is required at a minimum of one site in an MSA with a population of 1 million or larger.

In the Kansas City area, the Troost site is critical, because it is the only PM_{2.5} site near the center of the Kansas City metropolitan area. The Liberty site is critical because it is the only PM_{2.5} site generally downwind of the Kansas City area. The Richards Gebaur-South site is judged to be critical, because it provides important upwind background data for the Kansas City area. The Linden Hills site is a required near roadway site in the Kansas City CBSA with a population of 1 million or larger and is therefore critical.

The Hillcrest High School site is the only PM_{2.5} site in the Springfield area and is therefore judged to be critical.

In the remainder of the state, the El Dorado Springs site is considered to be critical, because it provides important rural, regional background data for the Kansas City area. The St. Joseph site is critical, because it is the only site in the St. Joseph area and is exceeding 85% of the annual standard.

11.0 Lead Network Assessment

11.1 Introduction: Lead Standards and Monitoring Requirements

The level of the primary and secondary NAAQS for airborne lead is $0.15 \mu\text{g}/\text{m}^3$, measured as total suspended particulate matter (TSP). The form of the standard is the rolling three-month average of monthly averages. The rolling three-month average considers each of the 12 three-month periods associated with a given year, not just the four calendar quarters within that year. Attainment of the standard is evaluated over a three-year period. The NAAQS are listed in the [EPA NAAQS Table](#) on the internet. The lead NAAQS were most recently reviewed and retained in October 2016.

At a minimum, monitors must be placed in areas potentially impacted by non-airport sources of lead emissions greater than or equal to 0.50 tons per year and from airport sources which emit 1.0 or more tons per year. EPA Regional Administrators may waive the source-oriented monitoring requirements if the monitoring agency can demonstrate that emissions from the source will not contribute to maximum air lead concentrations greater than 50% of the standard.

11.2 Lead Monitoring Results in Missouri

The lead monitoring network in Missouri is shown in Figure 11-1. There are seven state-operated monitoring sites in Missouri: three in the Herculaneum area, two in the new lead belt area, one near a facility in northwest Missouri, and one in St. Louis. At the Blair St. site in St. Louis, lead is measured along with other metallic species using a PM_{10} sampler as a part of the National Air Toxics Trends Stations (NATTS) program, not for purposes of NAAQS compliance. All of these sites except the Blair St. site are located near identified or potential lead sources related to current or past lead mining, processing or remediation activities. As indicated in the figure, there are also several sites operated by the Doe Run Company in the Herculaneum and new lead belt areas.

Table 11-1 lists design values (maximum three-month rolling average concentrations during a three-year period) for the state and industry-operated sites. Figure 11-2 shows time-series graphs of these design values. Annual maxima are generally decreasing, and design values are expected to be below the level of the standard in future years.

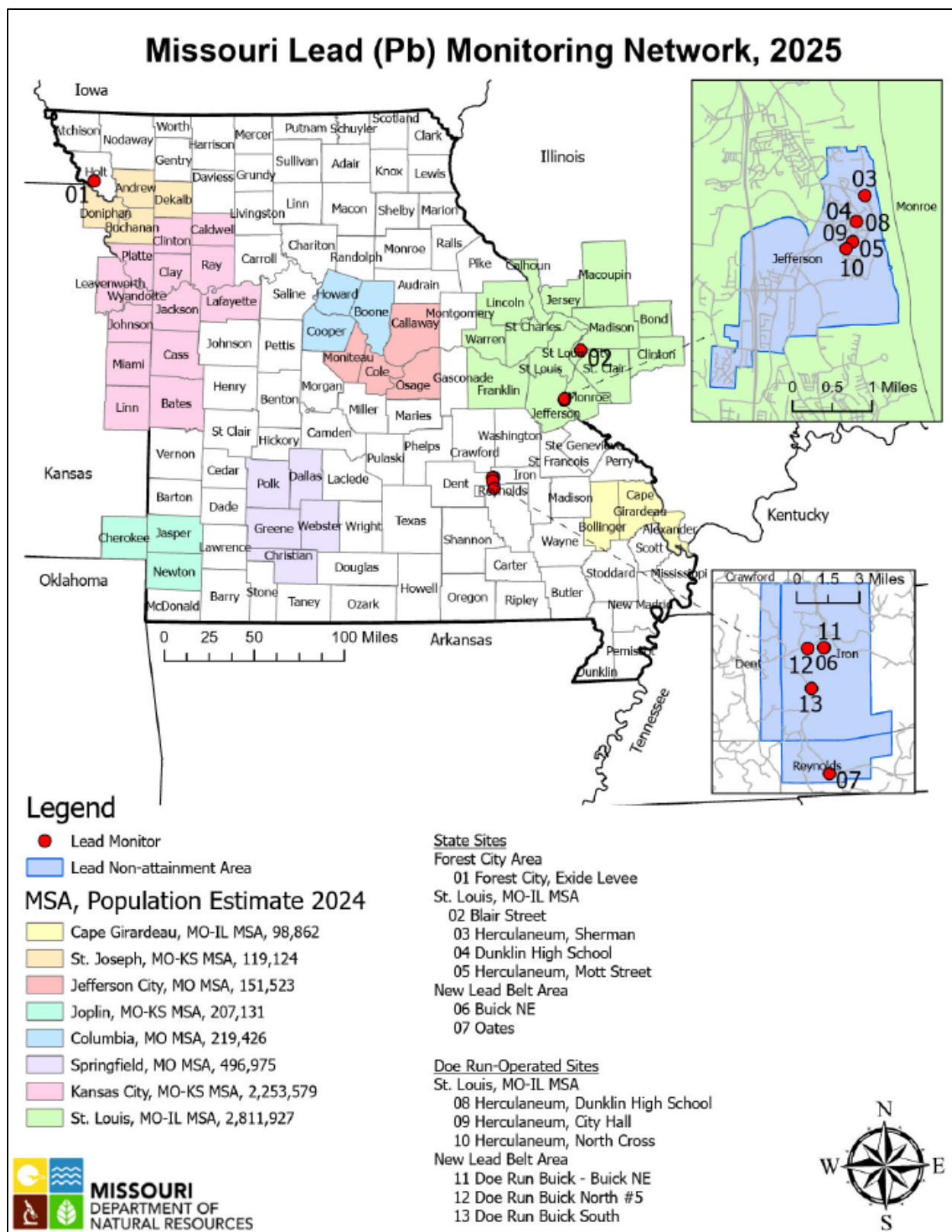


Figure 11-1. 2025 Missouri Lead Monitoring Network

Table 11-1

Lead Design Values, $\mu\text{g}/\text{m}^3$ (Maximum Rolling 3-Month Lead-TSP Average Over a 3-Year Period) ^{1, 2, 3, 4}					
Yellow Highlights Indicate Design Values Exceeded the Standard (0.15 $\mu\text{g}/\text{m}^3$)					
State of Missouri Operated Sites					
Site Name	17-19	18-20	19-21	20-22	21-23
Blair Street					
Buick Northeast	0.13	0.14	0.14	0.14	0.14
Exide Levee	0.02	0.02	0.02	0.02	0.02
Fletcher		0.03	0.02	0.03	
Herculaneum, Dunklin High School	0.16	0.16	0.04	0.03	0.03
Herculaneum, Mott Street	0.21	0.11	0.09	0.05	0.04
Herculaneum, Sherman	0.05	0.05	0.03	0.02	0.01
Oates	0.04	0.04	0.03	0.03	0.03
St. Joe State Park	0.03	0.03	0.03		
Ursuline North	0.01	0.01	0.01	0.01	
Industry Operated Sites					
Site Name	17-19	18-20	19-21	20-22	21-23
Buick - North					
Buick - South					
Buick Northeast	0.10	0.08	0.10	0.10	
Herculaneum - Mott Street (City Hall)	0.23	0.11	0.10	0.06	0.06
Herculaneum - Dunklin High School	0.11	0.11	0.03	0.04	
Herculaneum - North Cross	0.10	0.10	0.06	0.05	0.04
Herculaneum - Sherman	0.05				
¹ Blair Street site cannot be compared to the lead NAAQS because the site measures PM ₁₀ lead. ² State Operated Sites Fletcher, St. Joe State Park, and Ursuline North Have Been Discontinued. ³ Industry Operated Sites Herculaneum - Dunklin High School and Herculaneum - Sherman have Been Discontinued. ⁴ Buick - North and Buick - South Are Non-Ambient.					

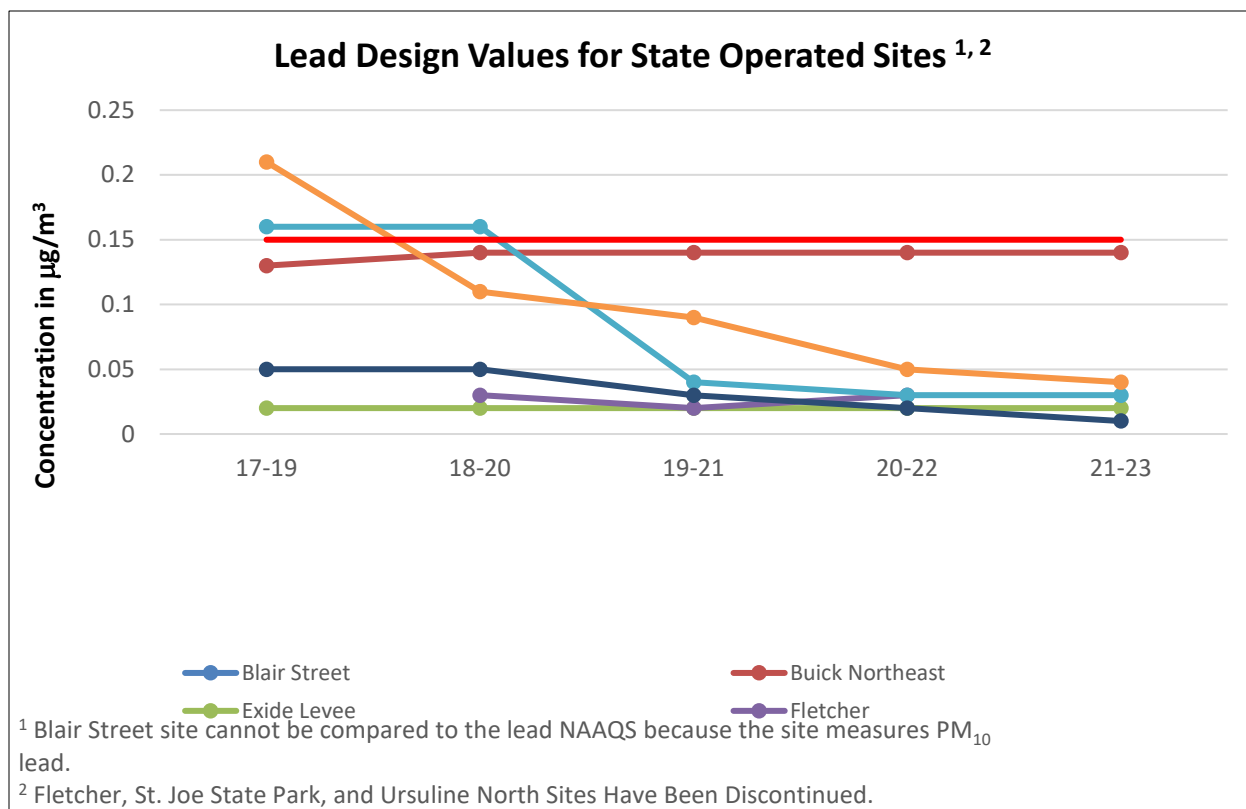


Figure 11-2a. Design Values for State Operated Lead Sites

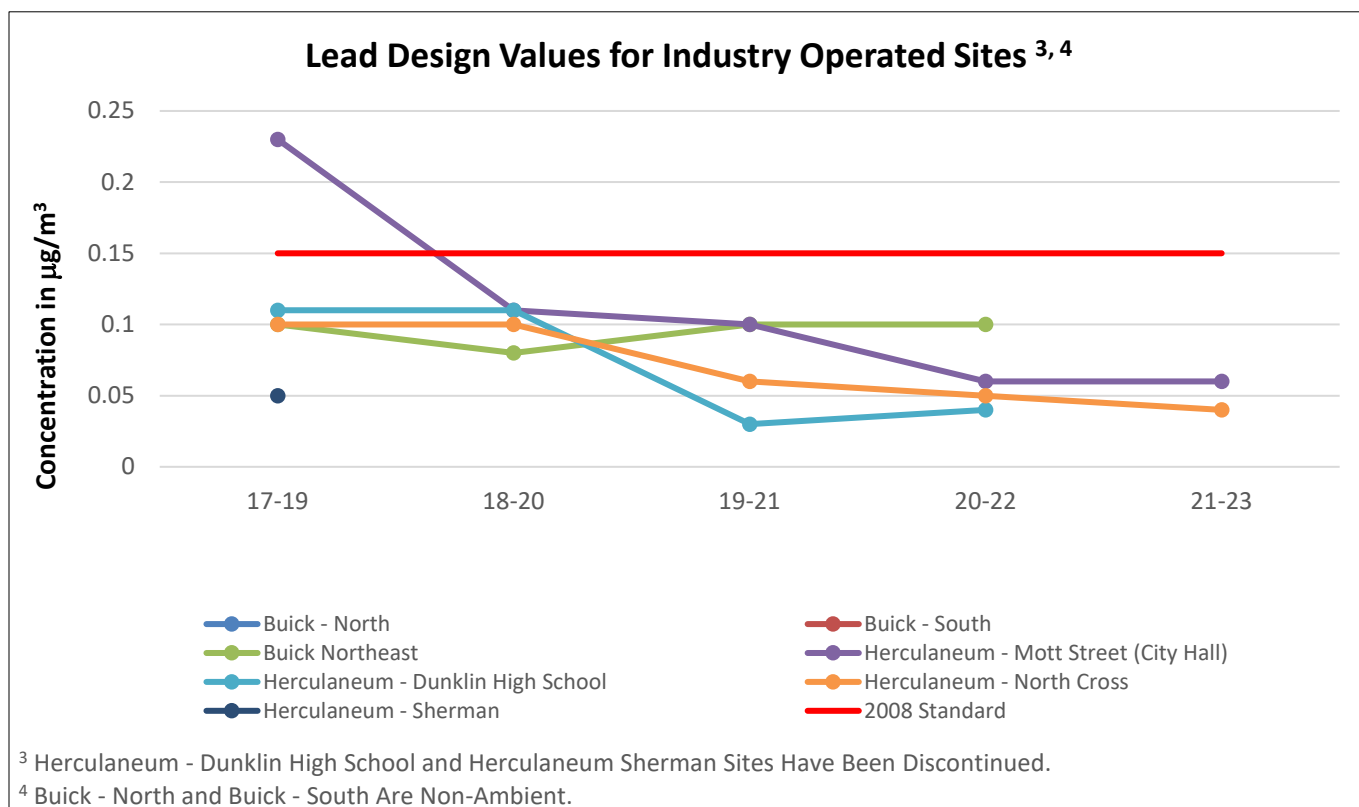


Figure 11-2b. Design Values for Industry Operated Lead Sites

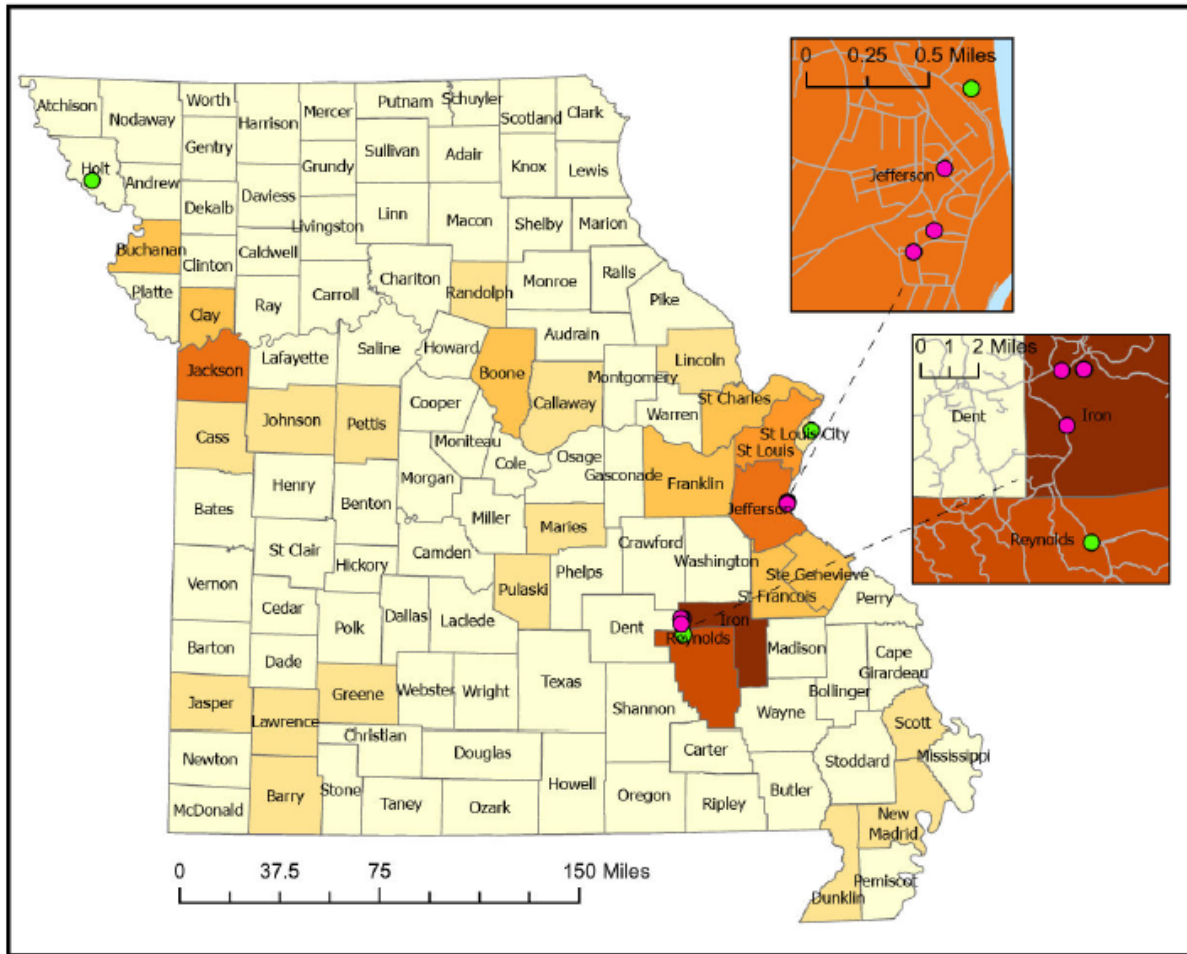
11.3 Lead Emissions

Figure 11-3 shows point source lead emissions by county. Sources include the Buick secondary smelter, the Forest City secondary smelter, and the Buick, Fletcher, and Brushy Creek mines or mills. Total lead emissions in 2023 according to the Emission Inventory Questionnaires from these facilities were 1.1 tons. Primary smelting at Herculanium was discontinued at the end of 2013, and the installation was permanently closed since the last assessment. Emission control equipment has been installed at the Buick and Exide secondary smelters. Therefore, point source emissions from these facilities have been greatly reduced.

After considering the sources above, the next highest lead emitter according the Emission Inventory Questionnaires for emission reporting year 2023 was 0.26 tons per year. The 2020 National Emissions Inventory showed a similar result from a different facility.

Details of point, area (non-mobile), and mobile source lead emissions by county using 2020 NEI data may be found in Figures 11-3, 11-4, and 11-5 respectively. There were zero mobile source emissions, 2.6 tons of area source (non-mobile) emissions from prescribed burns and fuel combustion, and 9.5 tons from point sources. Some higher point source emissions came from airports, secondary lead smelting, and mines/quarries.

Missouri Lead (Pb) Point Source Emissions



Legend

- Industry Monitor
- State Monitor

2020 Lead Point Source Emissions (tpy)

Lead

- 0.00
- 0.00 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 1.30
- 1.30 - 3.40



Figure 11-3. 2020 Point Source Lead Emissions and 2025 Monitoring Network

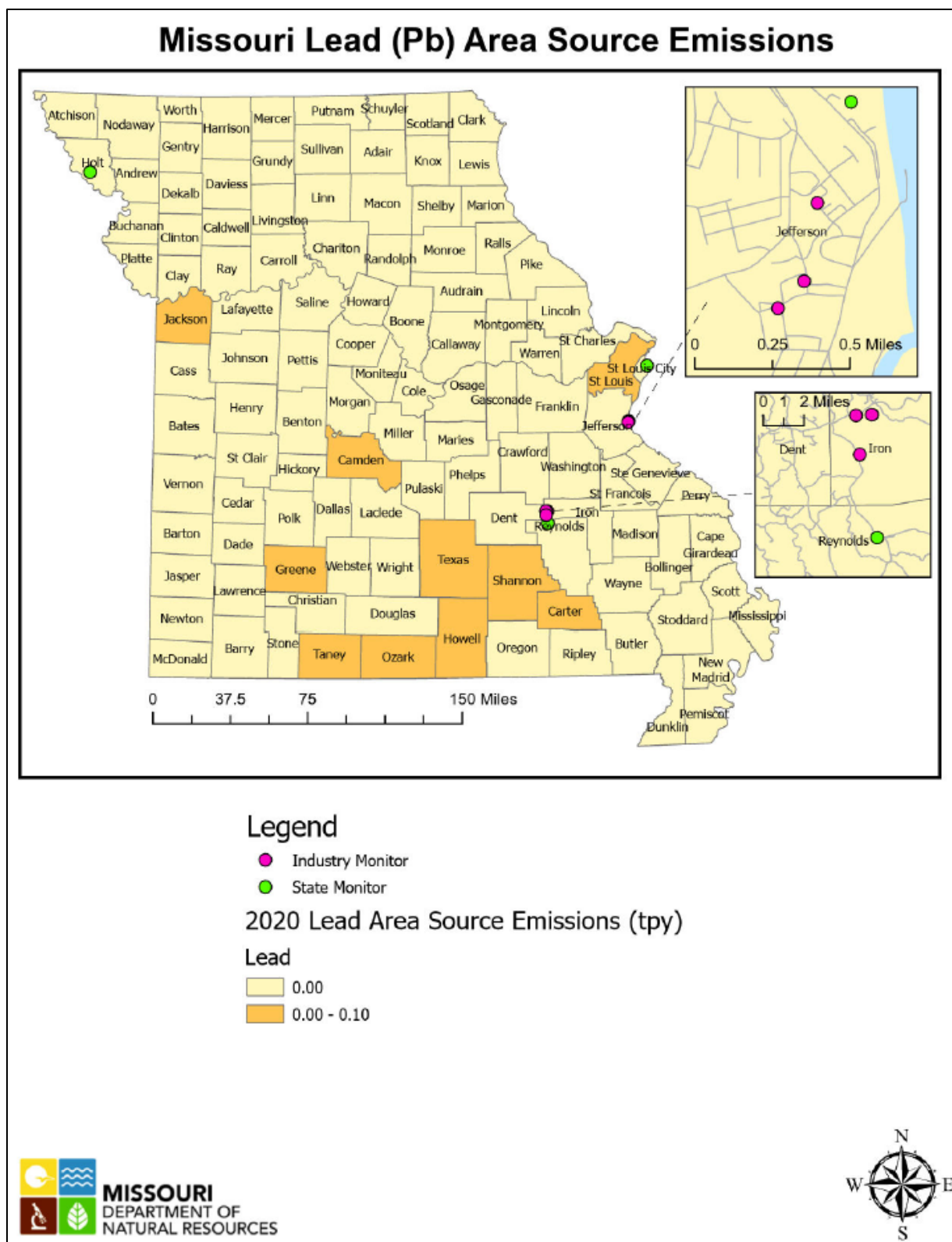
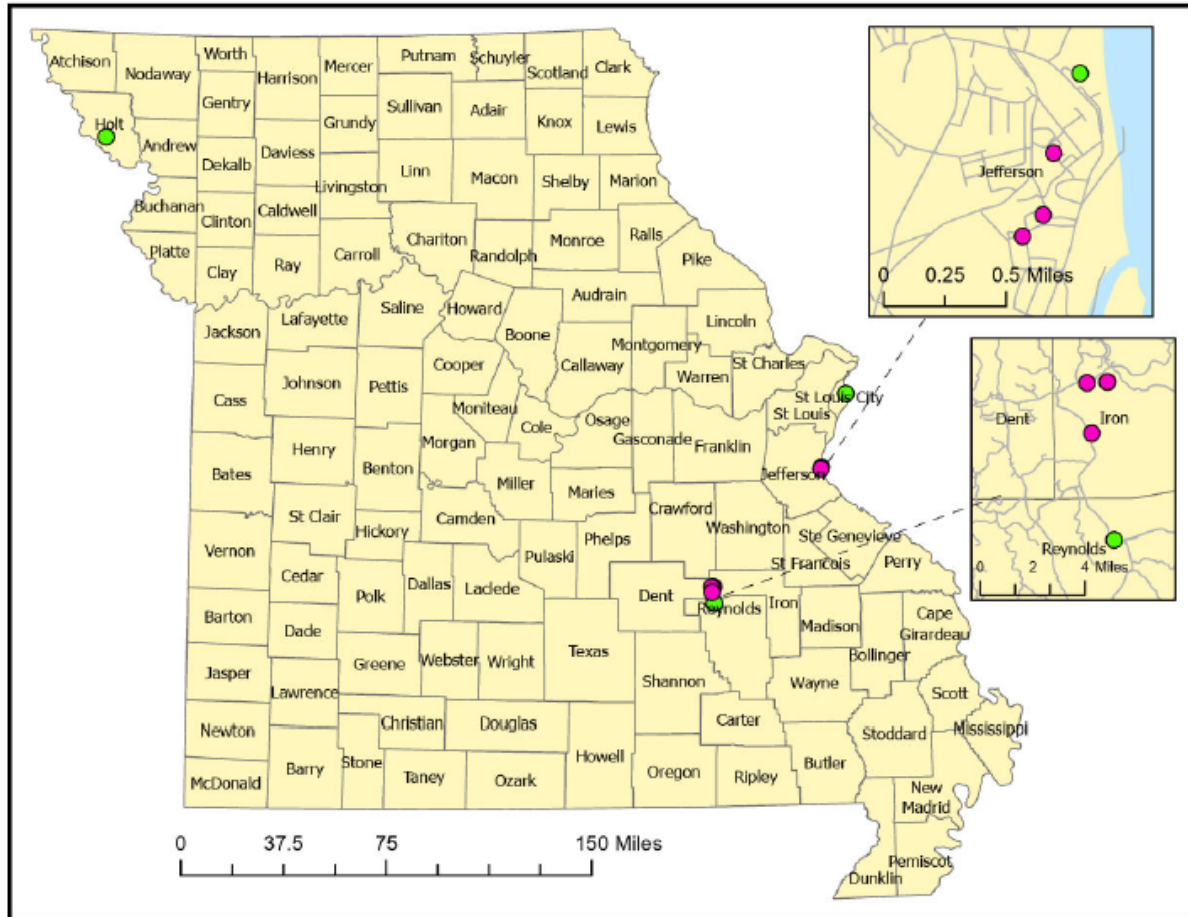


Figure 11-4. 2020 Area Source (Non-Mobile) Lead Emissions and 2025 Monitoring Network

Missouri Lead (Pb) Mobile Source Emissions



Legend

- Industry Monitor
- State Monitor

2020 Lead Mobile Source Emissions (tpy)

Lead

0.00



Figure 11-5. 2020 Mobile Source Lead Emissions and 2025 Monitoring Network

11.4 Evaluation of the Lead Monitoring Network

Operation of the primary smelter at Herculanum was discontinued at the end of 2013 and the facility was permanently closed since the last assessment. Even though the primary smelter has closed, two of the department operated monitoring sites in the Herculanum area, Dunklin High School and Mott Street continue to be considered to be critical. The Sherman site has shown three-month rolling average design values to be no greater than $0.05 \mu\text{g}/\text{m}^3$ since 2017 and the most recent design value period to be $0.01 \mu\text{g}/\text{m}^3$. The department is recommending a discontinuation of the site as a result of the consistently low concentrations. The Herculanum area network will continue to be re-evaluated in future monitoring plans and network assessments, so its makeup may change in the future, but it should be continued in essentially its present configuration until more data is available.

The old lead belt area has multiple areas containing waste (tailings and chat) from past lead mining operations. Remediation activities in the Park Hills area are complete, and the Park Hills site was discontinued. Remediation activities in St. Joe State Park are also complete, and the site was discontinued since the last assessment.

Buick and Forest City are both secondary smelters. Both facilities have been or are being modified to include additional emission controls. Through 2023, the monitor near the Forest City facility has not shown a violation since 2013; however, the monitor near this facility is critical because of an agreement with the installation triggering contingency measures based on measured lead concentrations. The department-operated Buick Northeast monitor measured high concentrations and violated the lead NAAQS in 2024 and is therefore critical.

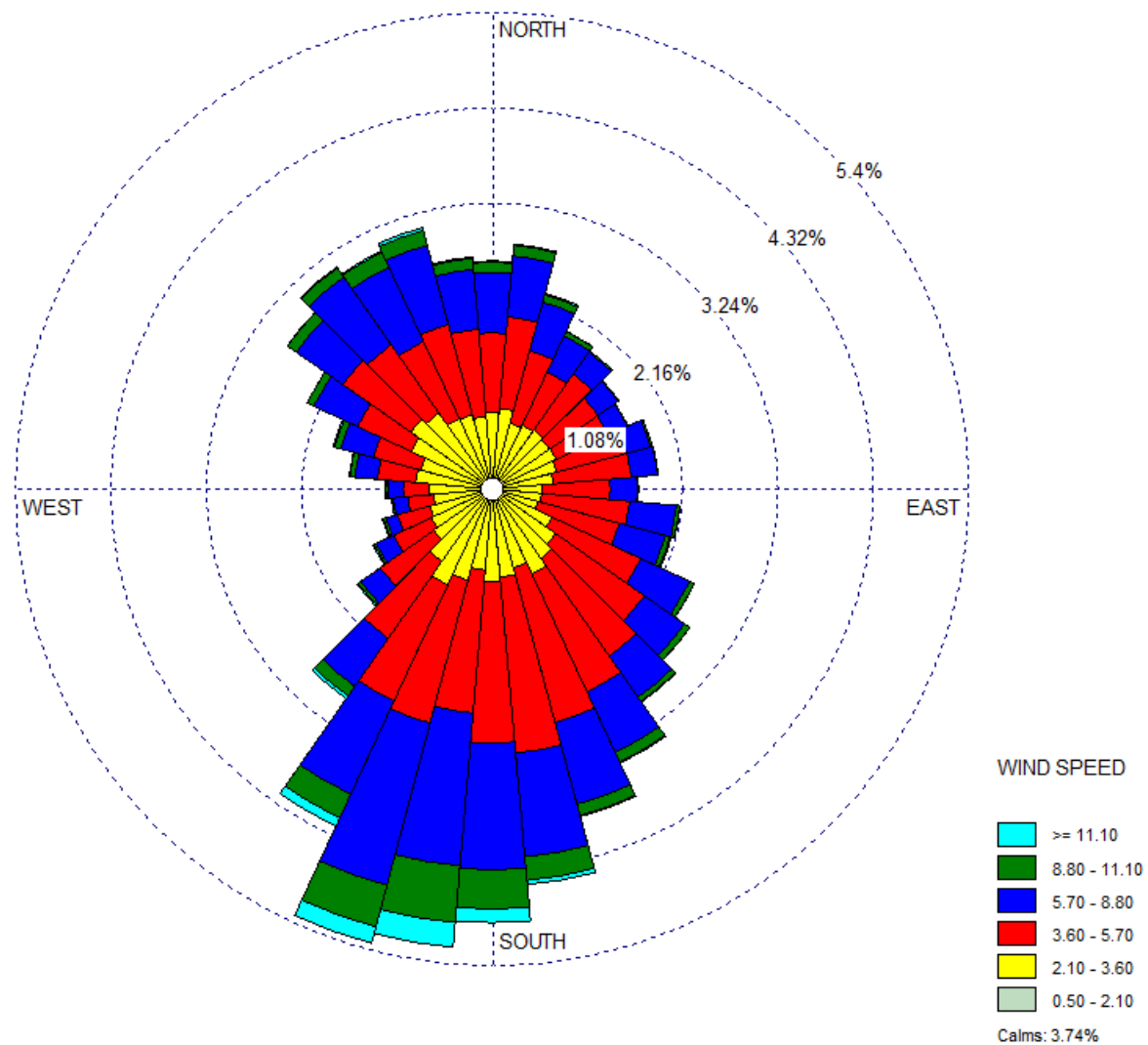
The monitors in the vicinity of operating lead mines and mills (Oates and Fletcher) have not recently shown exceedance of the standard. The highest three-month rolling average since the 2017 was $0.04 \mu\text{g}/\text{m}^3$ at the Oates site. However, these sites remain critical because of the level of reported lead emissions from these facilities. These monitors can be re-evaluated in the future depending on monitoring results and on reported emissions.

Appendix A: Wind Roses

Wind roses based on data from major airports were selected to represent regions in Missouri. The selected airport representing the west was Kansas City International Airport (KMCI). For the south, the Springfield Airport (KSGF) was selected, and Lambert-St. Louis International Airport (KSTL) was selected for the east. For the outstate monitor that is located in the northeast section of Missouri, the airport at Kirksville (KIRK) is used. Airport sites report official weather observations for the National Weather Service, and data are archived at the National Climatic Data Center for easy access. The wind roses were generated using WRPLOT VIEW – Lakes Environmental Software.

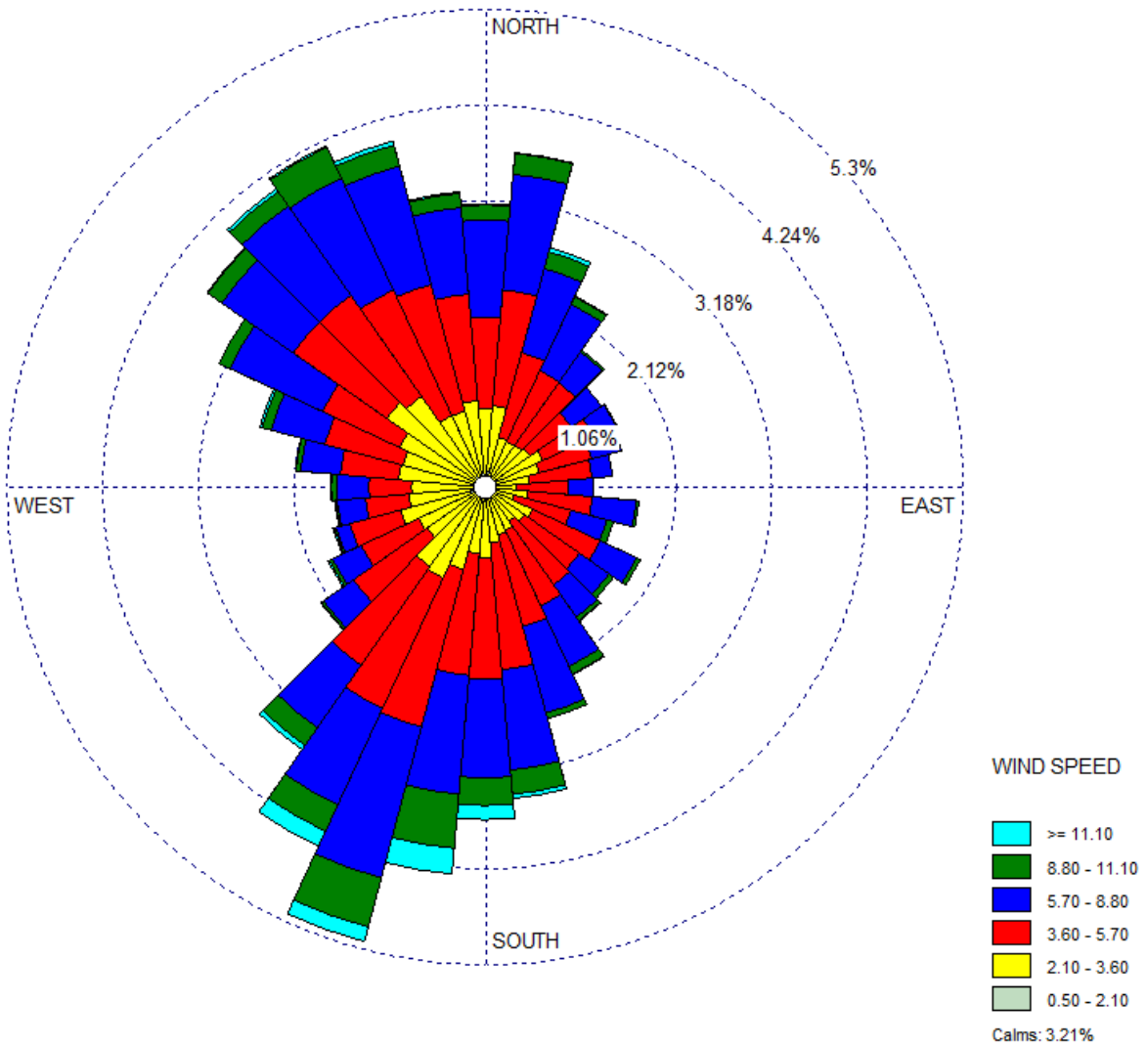
WIND ROSE PLOT:
Kansas City, MO 2020-2024 All Seasons Wind Rose

DISPLAY:
Wind Speed
Direction (blowing from)



WIND ROSE PLOT:
Kansas City, MO 2020-2024 Winter (Dec. - Feb.) Wind Rose

DISPLAY:
**Wind Speed
Direction (blowing from)**

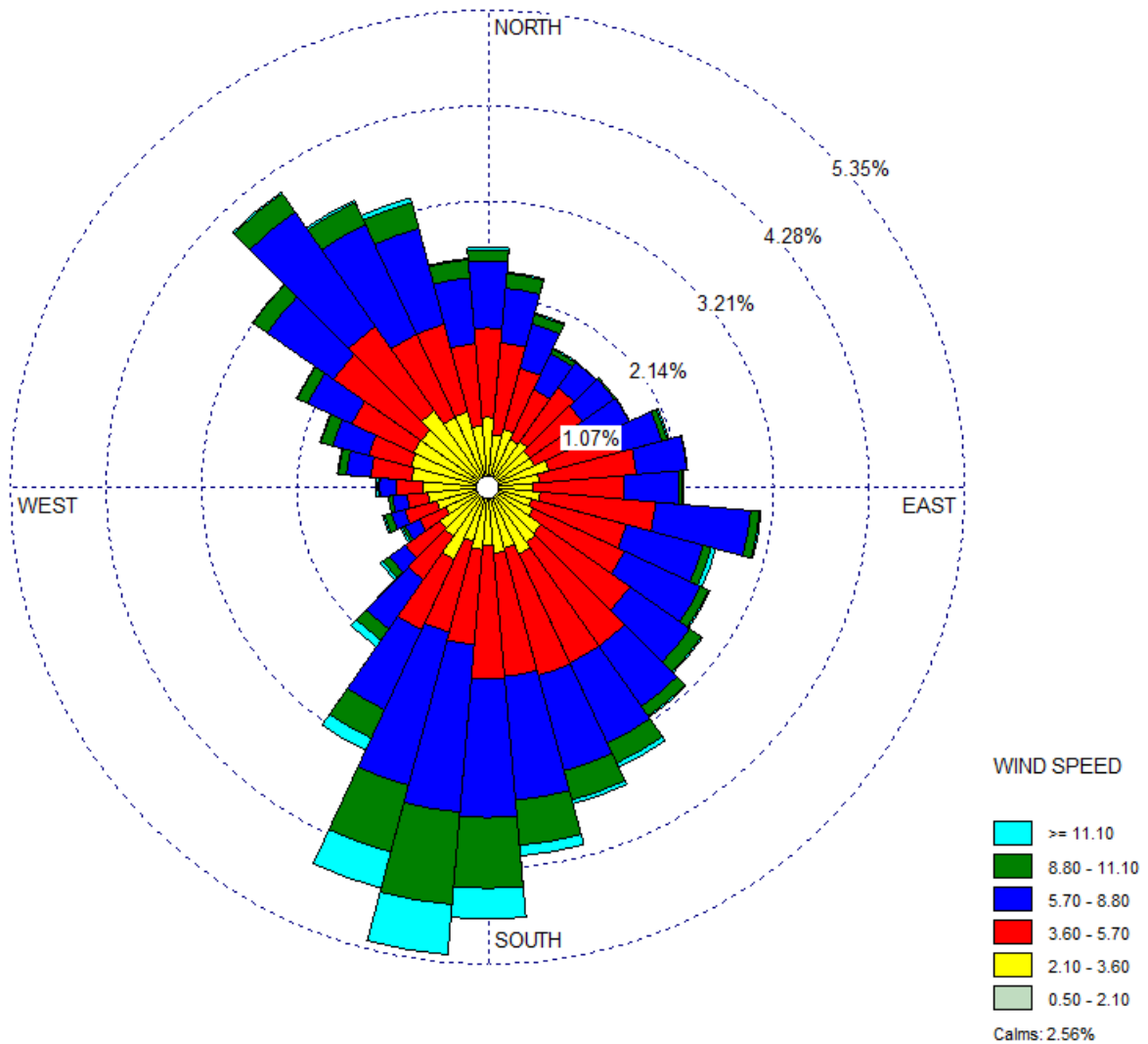


WIND ROSE PLOT:

Kansas City, MO 2020-2024 Spring (Mar. - May) Wind Rose

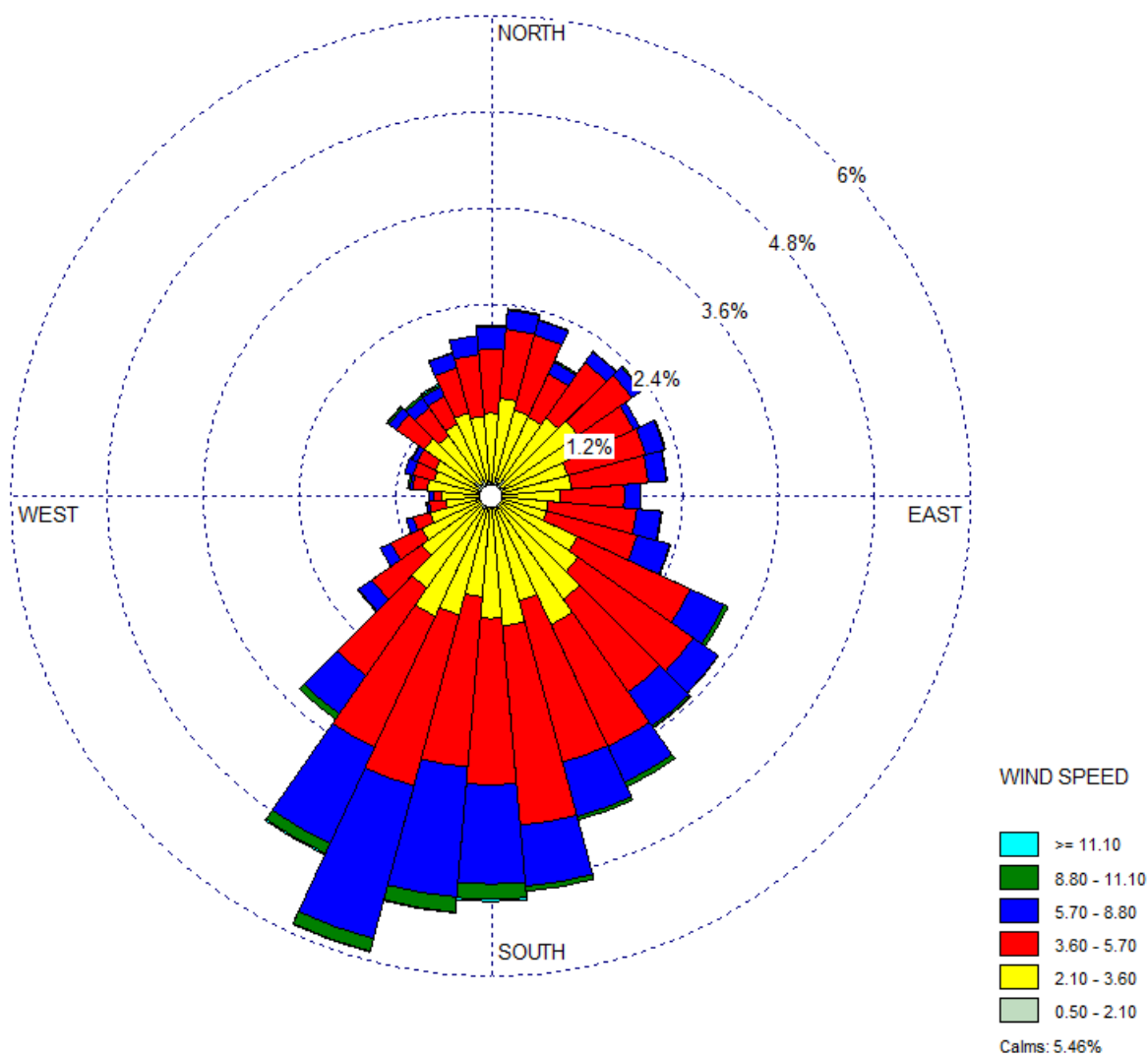
DISPLAY:

Wind Speed
Direction (blowing from)



WIND ROSE PLOT:
Kansas City, MO 2020-2024 Summer (Jun. -Aug.) Wind Rose

DISPLAY:
Wind Speed
Direction (blowing from)

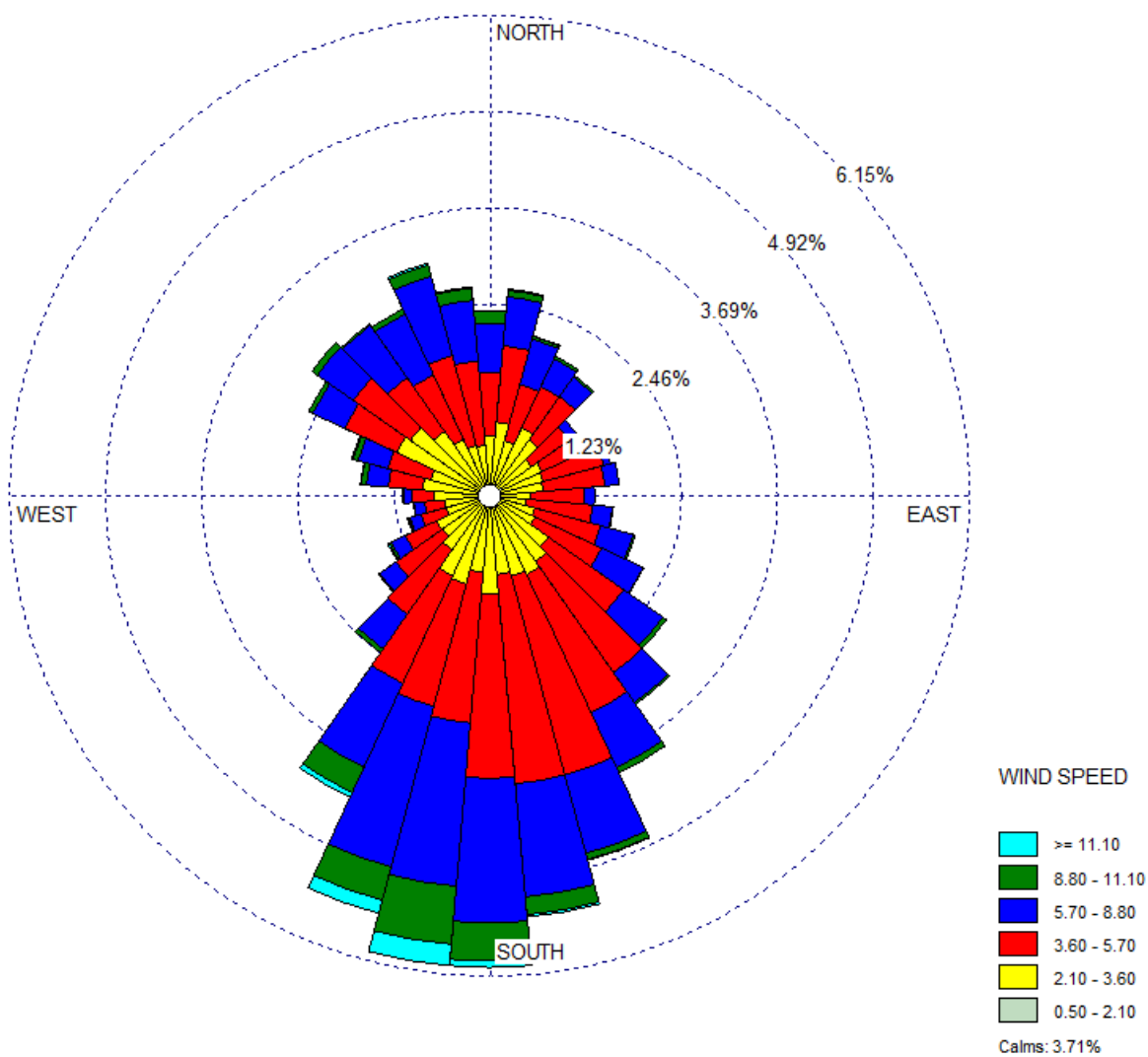


WIND ROSE PLOT:

Kansas City, MO 2020-2024 Fall (Sep. - Nov.) Wind Rose

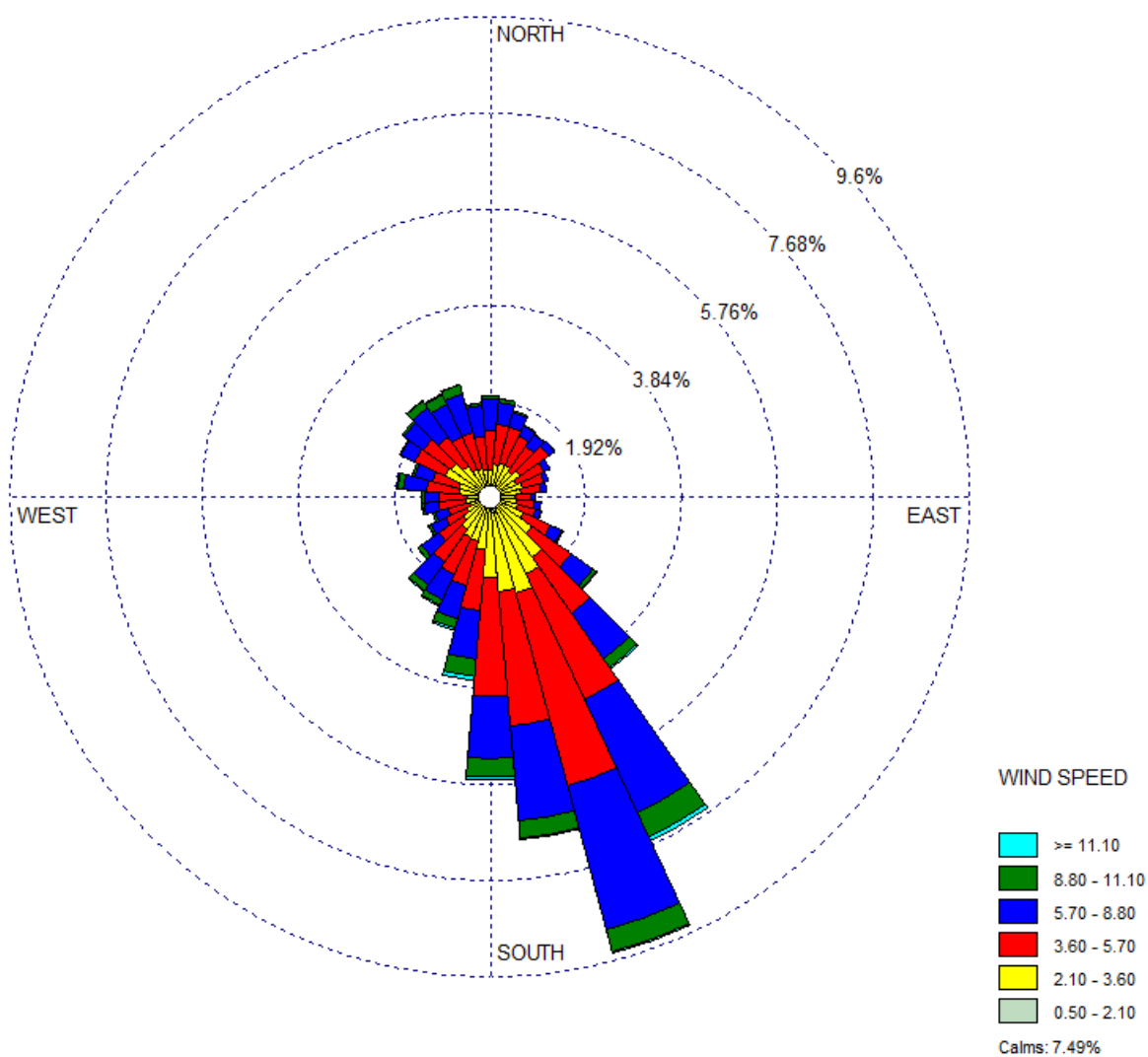
DISPLAY:

Wind Speed
Direction (blowing from)



WIND ROSE PLOT:
Springfield, MO 2020-2024 All Seasons Wind Rose

DISPLAY:
Wind Speed
Direction (blowing from)

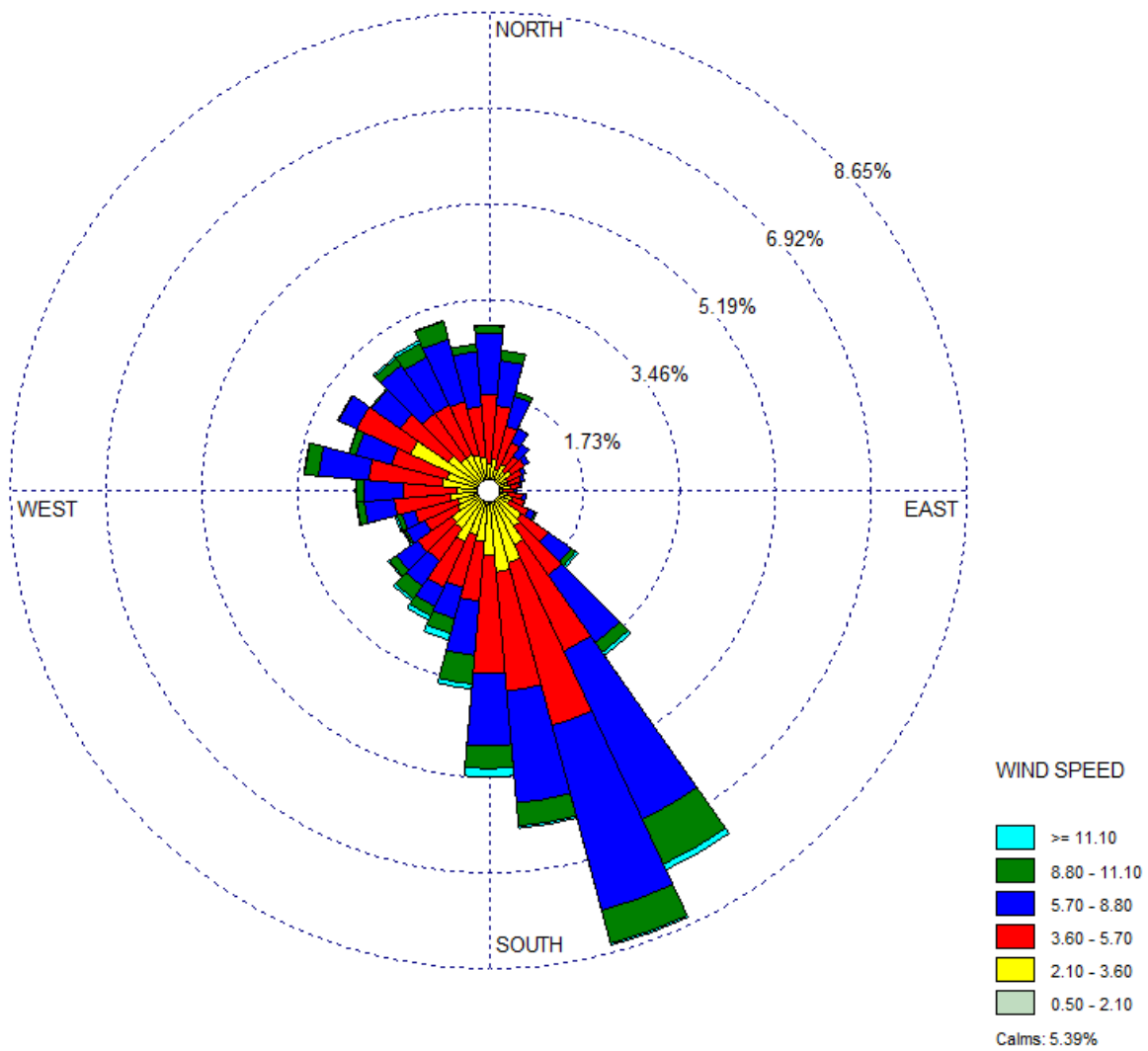


WIND ROSE PLOT:

Springfield, MO 2020-2024 Winter (Dec. - Feb.) Wind Rose

DISPLAY:

Wind Speed
Direction (blowing from)

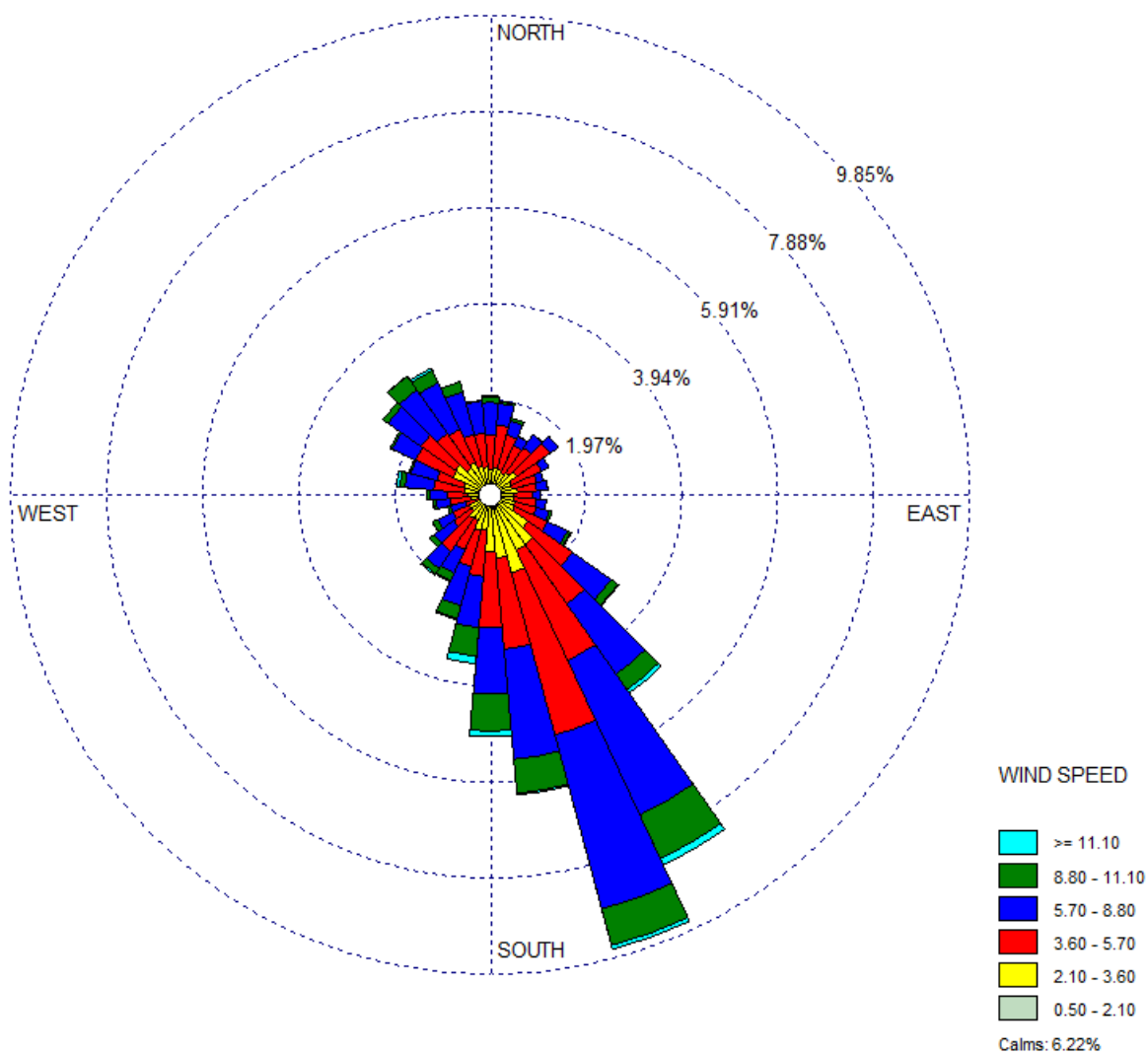


WIND ROSE PLOT:

Springfield, MO 2020-2024 Spring (Mar. - May) Wind Rose

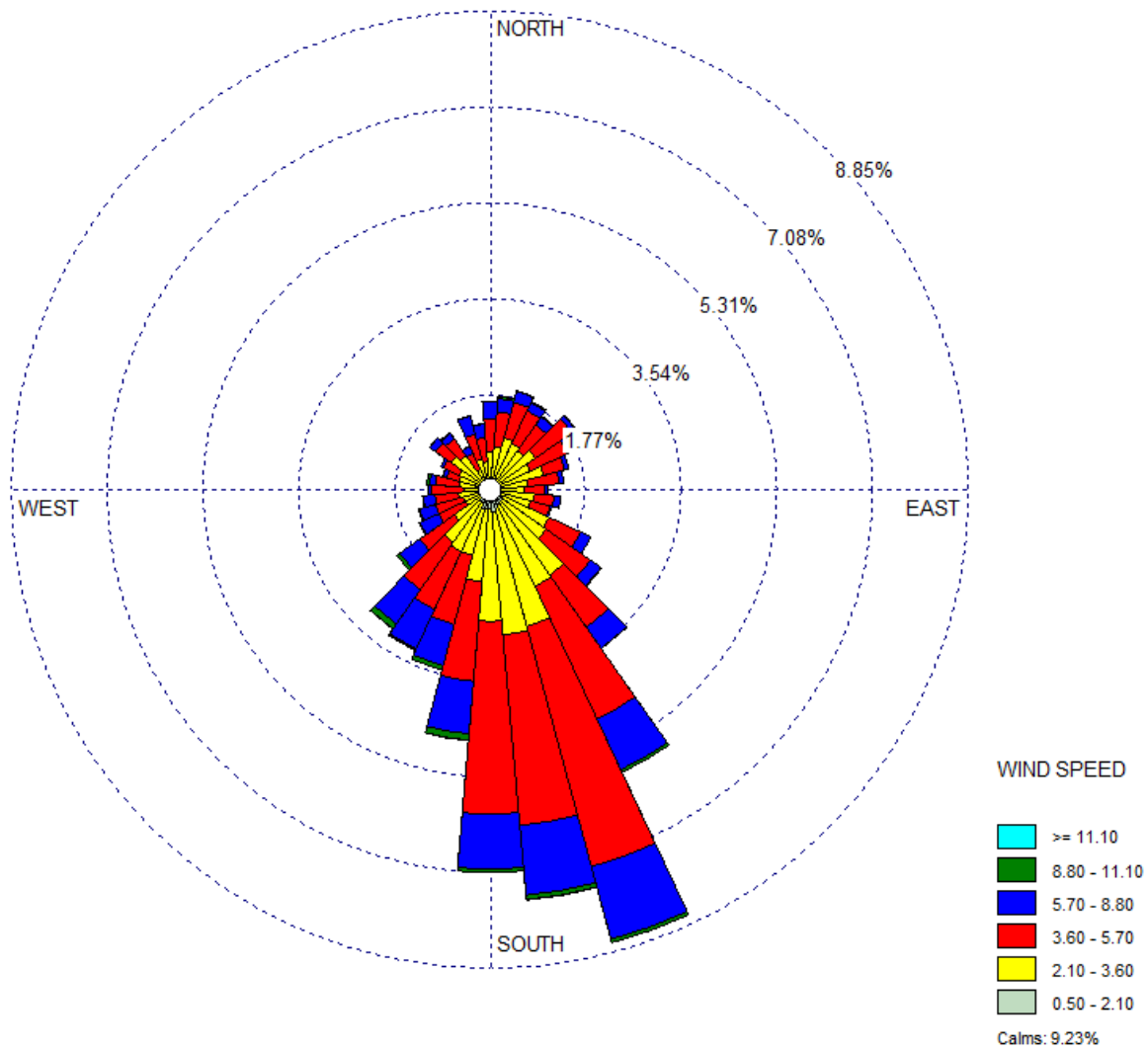
DISPLAY:

Wind Speed
Direction (blowing from)



WIND ROSE PLOT:
Springfield, MO 2020-2024 Summer (Jun. - Aug.) Wind Rose

DISPLAY:
Wind Speed
Direction (blowing from)

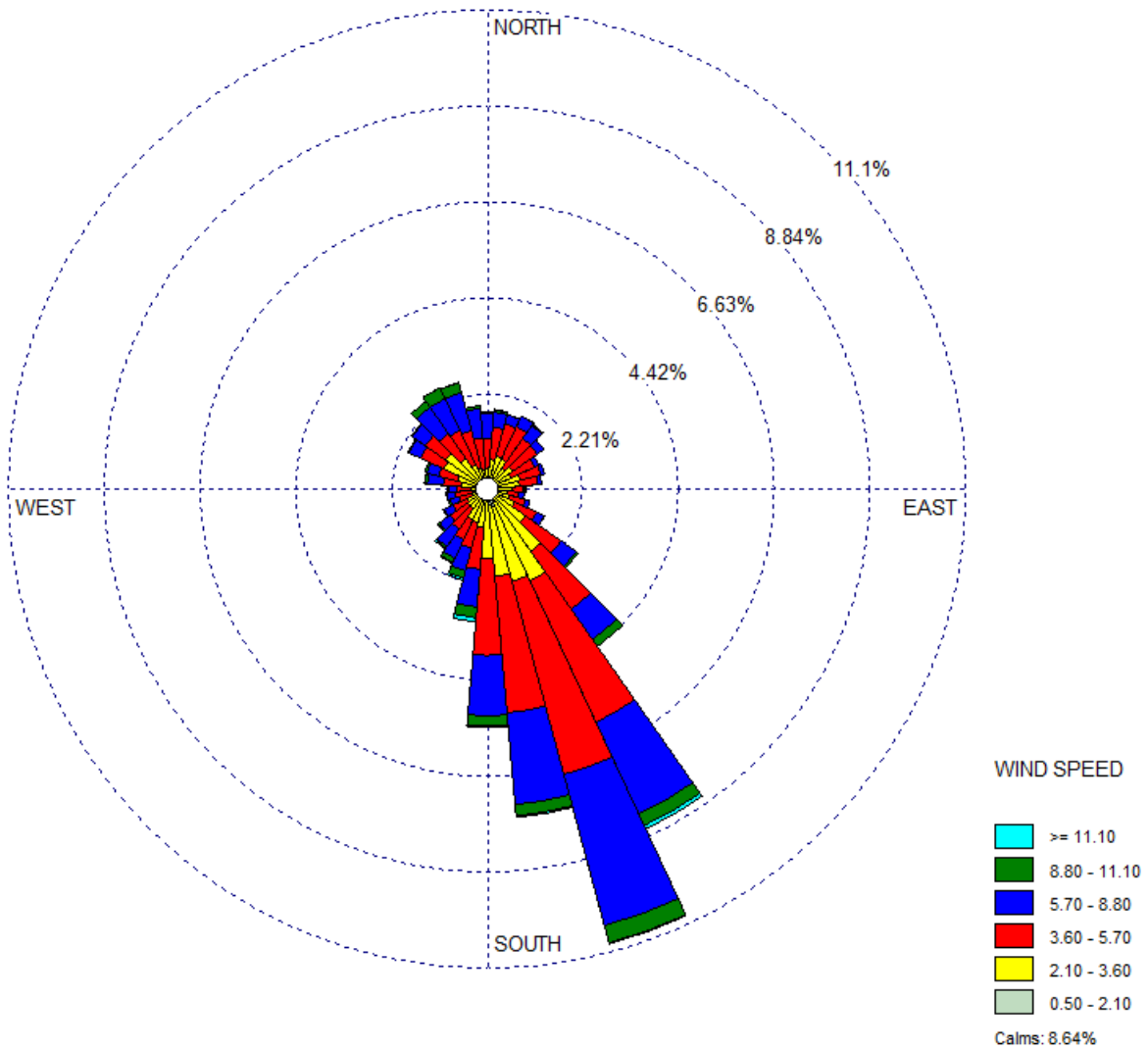


WIND ROSE PLOT:

Springfield, MO 2020-2024 Fall (Sep. - Nov.) Wind Rose

DISPLAY:

**Wind Speed
Direction (blowing from)**

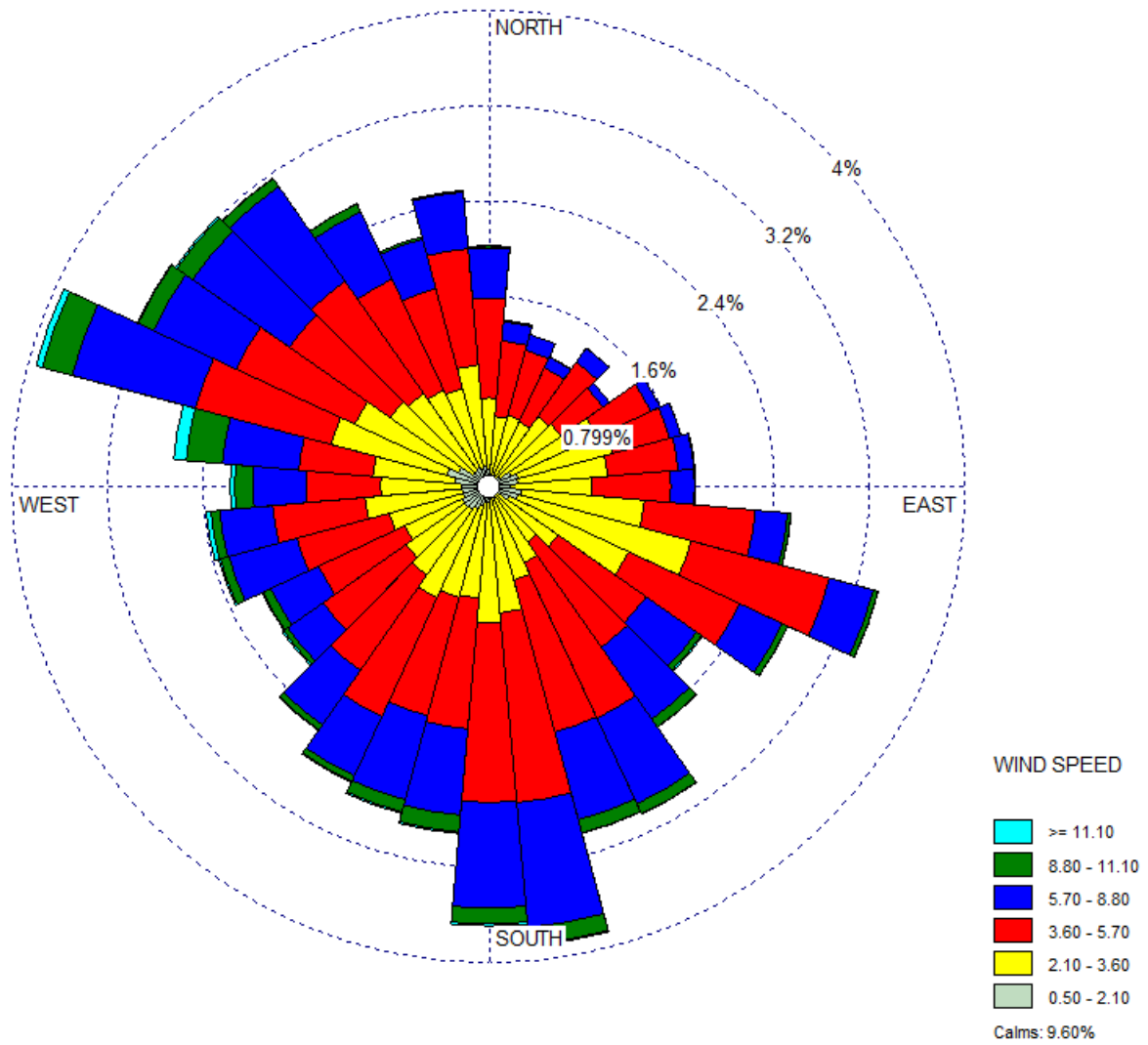


WIND ROSE PLOT:

St. Louis, MO 2020-2024 All Seasons Wind Rose

DISPLAY:

Wind Speed
Direction (blowing from)

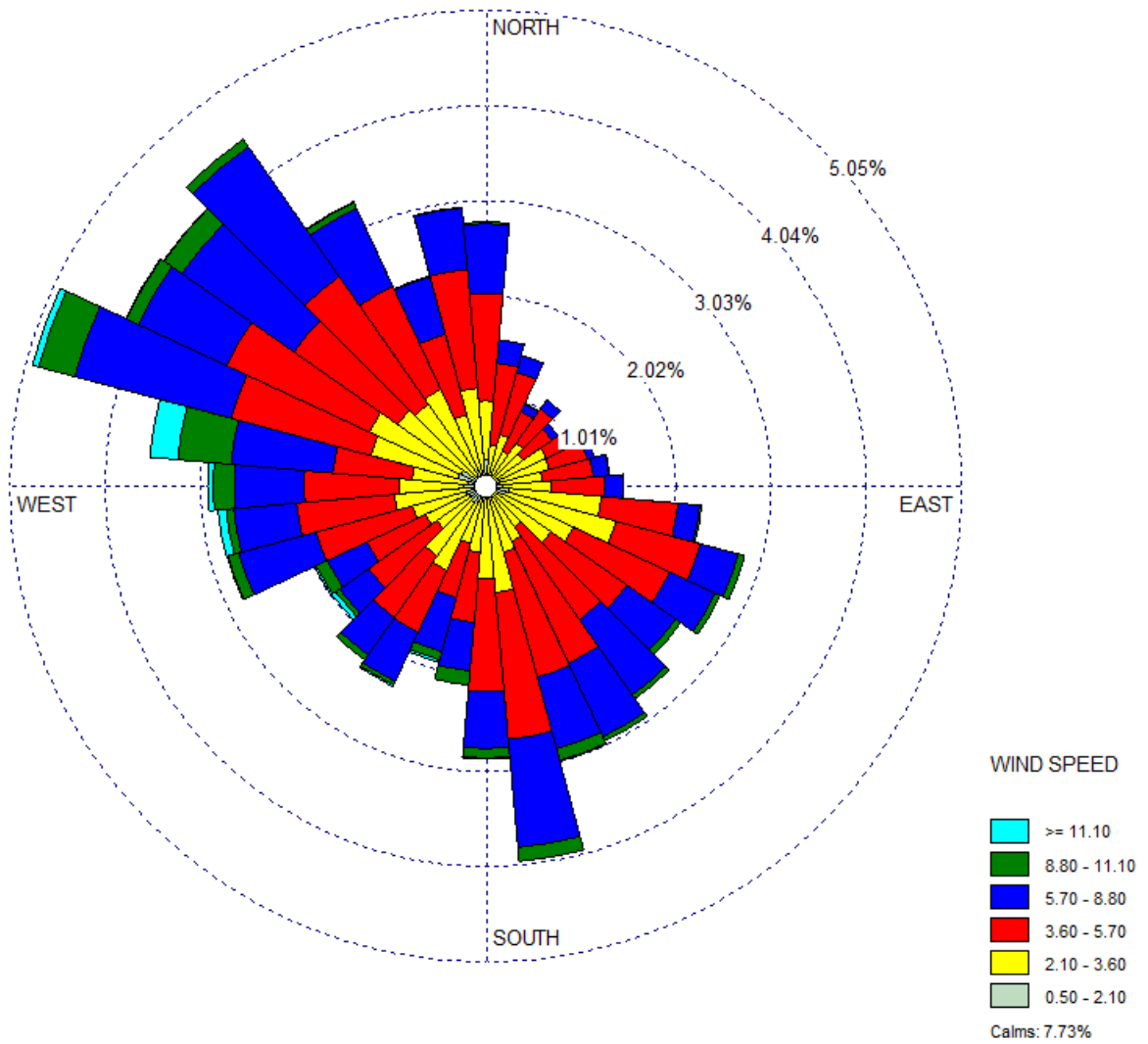


WIND ROSE PLOT:

St. Louis, MO 2020-2024 Winter (Dec. - Feb.) Wind Rose

DISPLAY:

Wind Speed
Direction (blowing from)

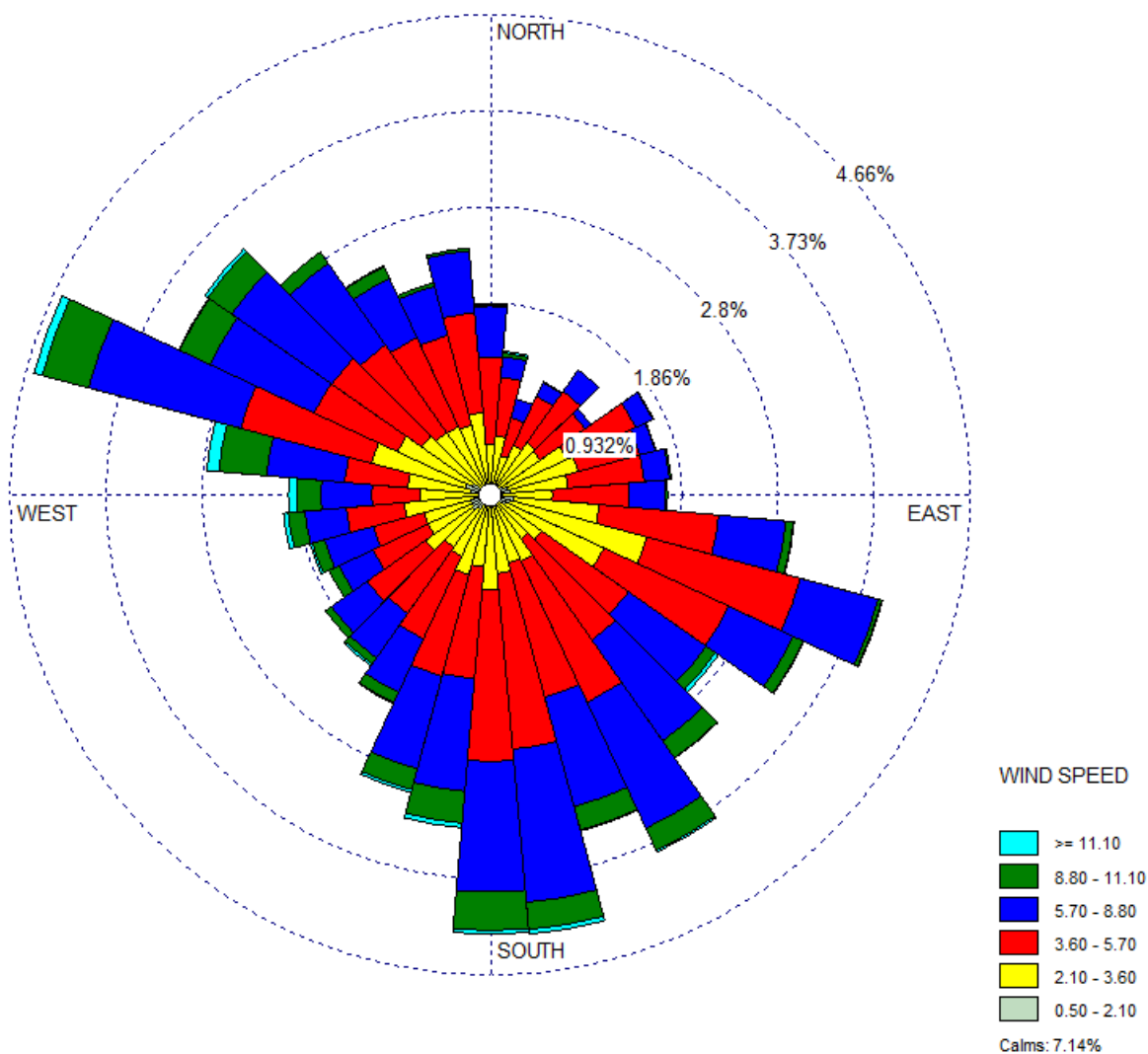


WIND ROSE PLOT:

St. Louis, MO 2020-2024 Spring (Mar. - May) Wind Rose

DISPLAY:

Wind Speed
Direction (blowing from)

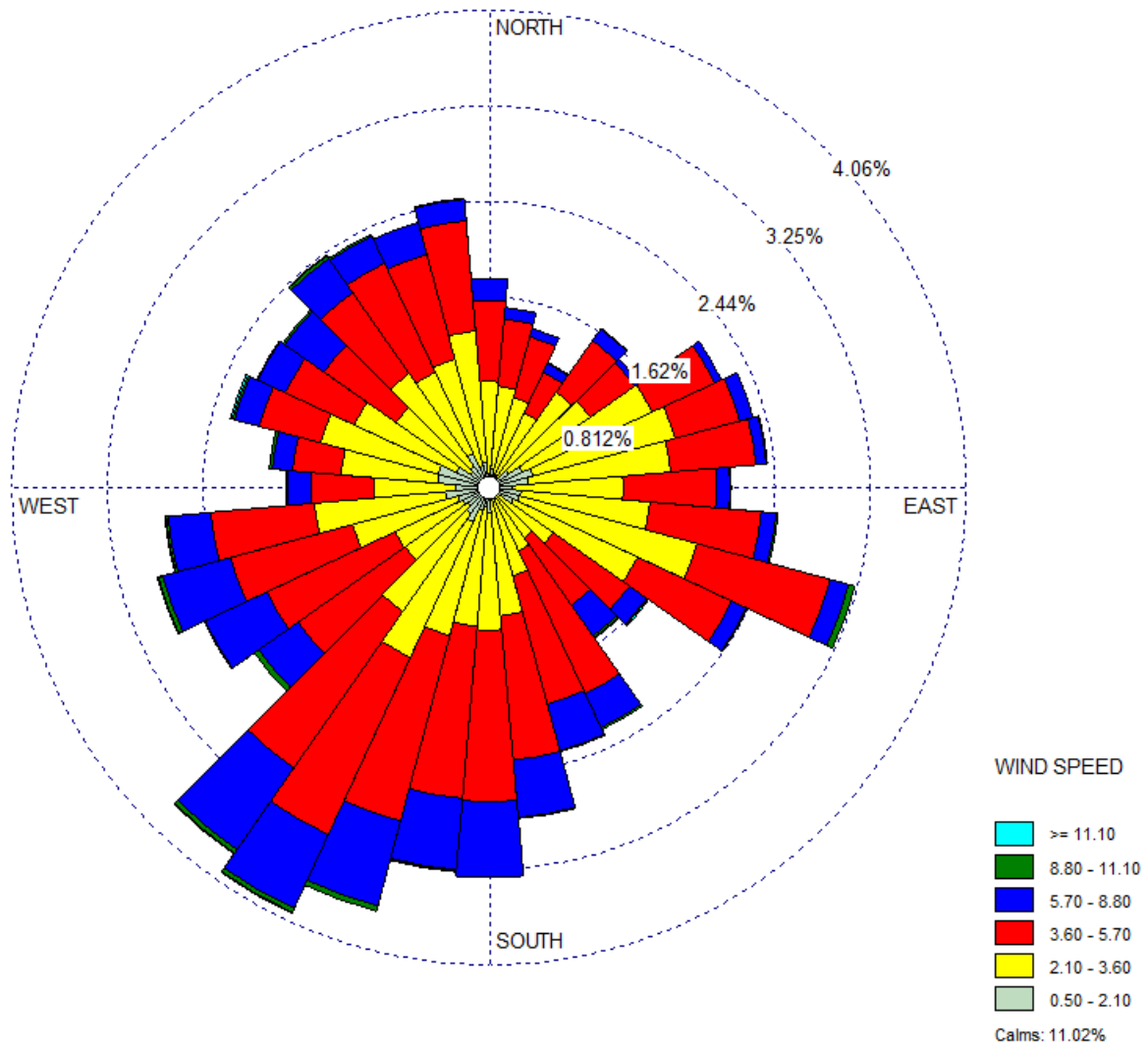


WIND ROSE PLOT:

St. Louis, MO 2020-2024 Summer (Jun. - Aug.) Wind Rose

DISPLAY:

Wind Speed
Direction (blowing from)

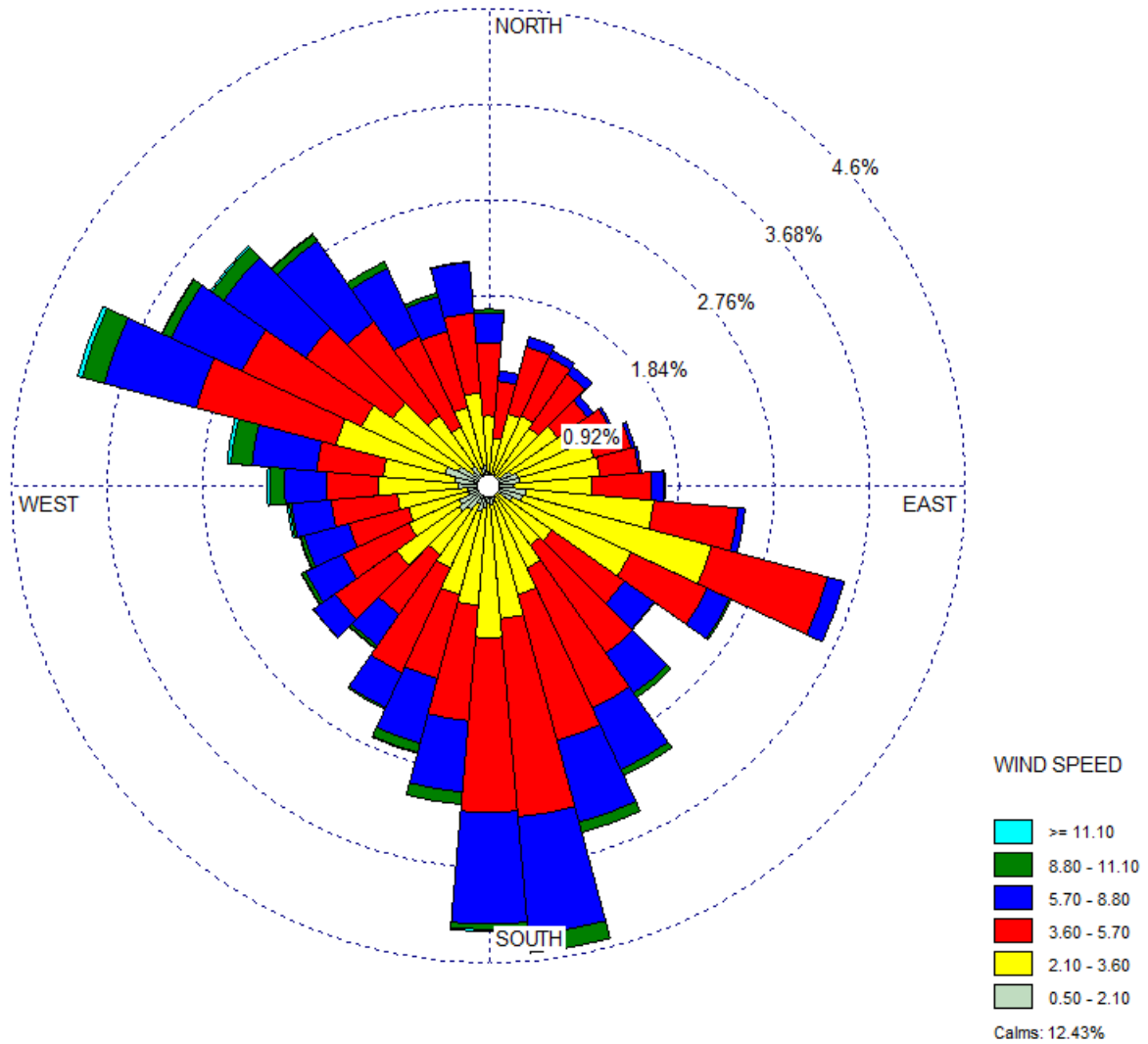


WIND ROSE PLOT:

St. Louis, MO 2020-2024 Fall (Sep. - Nov.) Wind Rose

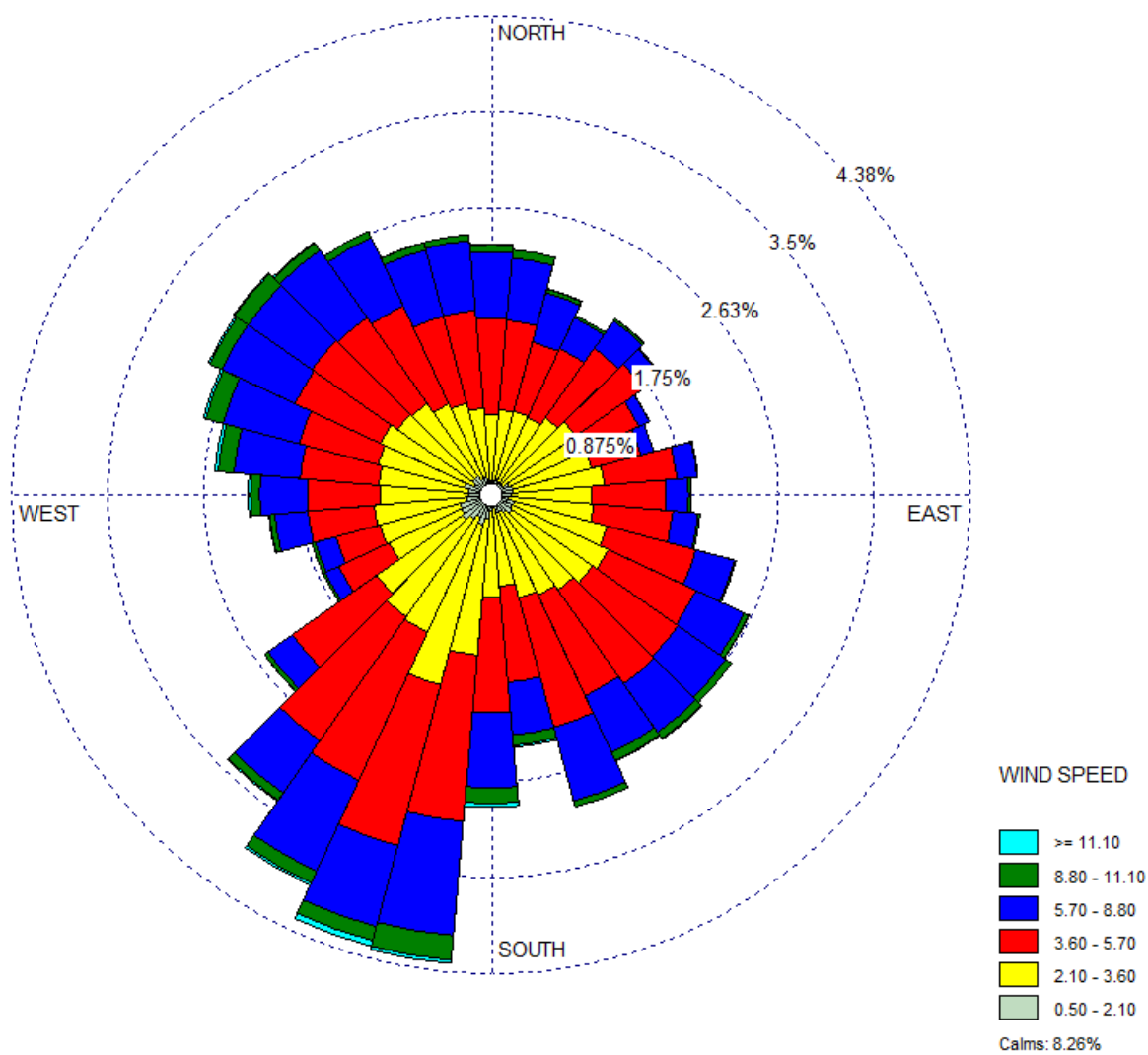
DISPLAY:

Wind Speed
Direction (blowing from)



WIND ROSE PLOT:
Kirksville, MO (Outstate) 2020-2024 All Seasons Wind Rose

DISPLAY:
Wind Speed
Direction (blowing from)

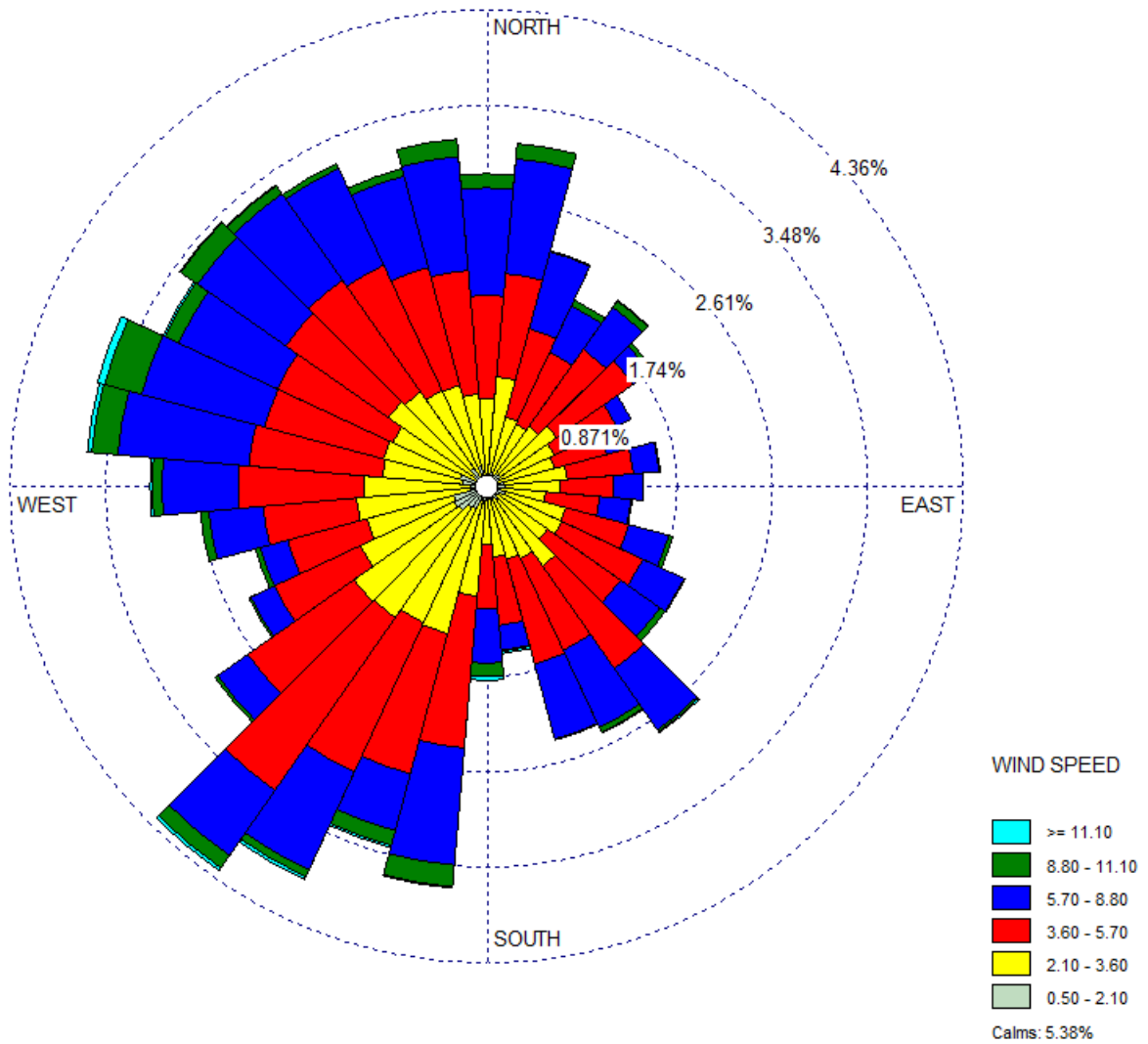


WIND ROSE PLOT:

Kirksville, MO (Outstate) 2020-2024 Winter (Dec. - Feb.) Wind Rose

DISPLAY:

Wind Speed
Direction (blowing from)

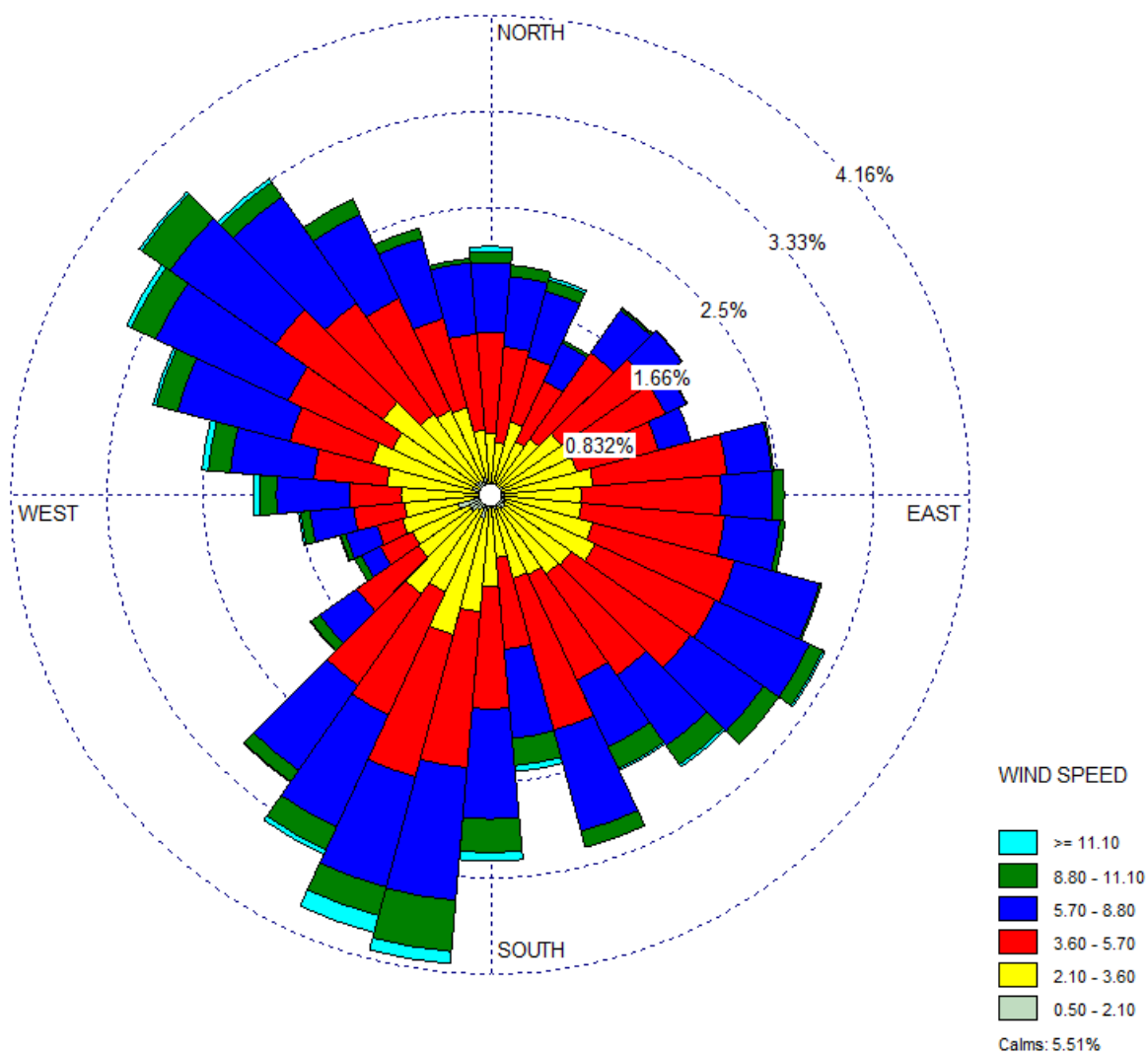


WIND ROSE PLOT:

Kirksville, MO (Outstate) 2020-2024 Spring (Mar. - May) Wind Rose

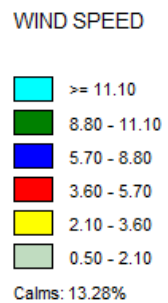
DISPLAY:

Wind Speed
Direction (blowing from)



Kirksville, MO (Outstate) 2020-2024 Summer (Jun. - Aug.) Wind Rose

Wind Speed
Direction (blowing from)

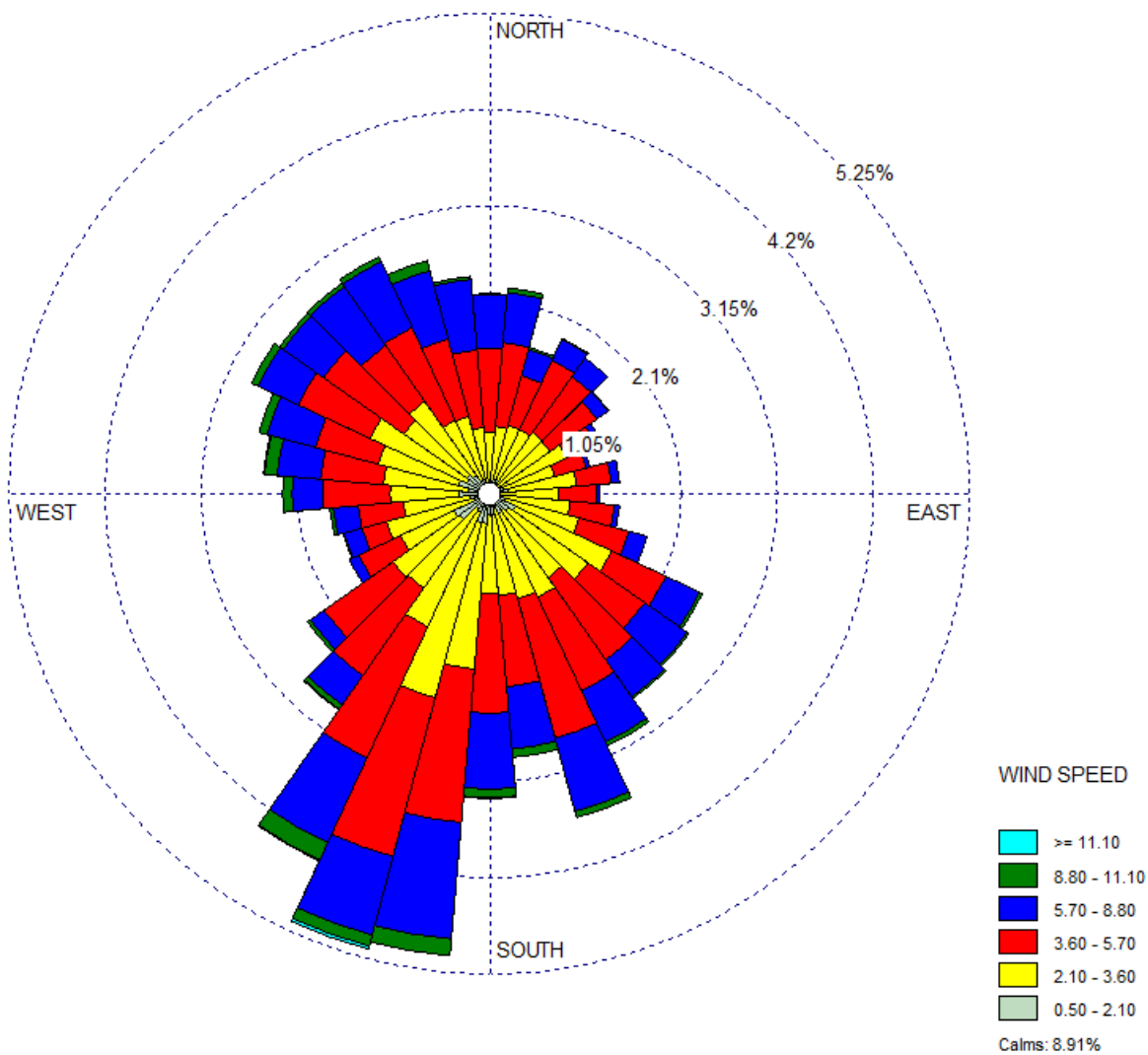


WIND ROSE PLOT:

Kirksville, MO (Outstate) 2020-2024 Fall (Sept. - Nov.) Wind Rose

DISPLAY:

Wind Speed
Direction (blowing from)



Appendix B: EPA Region 7 Air Monitoring Network Assessment Guidance

5-YEAR AIR QUALITY SYSTEM ASSESSMENT
CFR REQUIREMENTS & REGIONAL RECOMMENDATIONS

The five year air quality surveillance system assessment is required to determine at a minimum:

- 1) If the network meets the monitoring objectives defined in Appendix D
- 2) Whether new monitoring sites are needed
- 3) Whether existing sites are no longer needed and can be terminated
- 4) Whether new technologies are appropriate for incorporation into the air monitoring network.
- 5) Whether the network sufficiently supports characterization of air quality in areas with large populations of susceptible individuals
- 6) Whether discontinuance of a monitoring site would have an adverse impact on other data users or health studies.
- 7) For PM_{2.5} the assessment must identify needed changes to population oriented sites

In order to assess the network's suitability for the seven objectives listed above the State agency will need to assess the following information.

- 1) Statewide and local level population statistics
- 2) Statewide ambient air monitoring network pollutant concentration measurement trends for the past 5-years
- 3) Statewide and local level emission source trends, characteristics, and inventory
- 4) Statewide plans to modify, add, or remove emission sources
- 5) Statewide and local level meteorological impacts on pollutant concentrations.
- 6) Potential impacts of precursor chemical emissions on pollutant concentrations
- 7) Potential impacts of pollutant and precursor transport on measured concentrations.
- 8) Atmospheric dispersion modeling output generated as part of a permit application or control strategy effectiveness demonstration.
- 9) Network suitability to measure the appropriate spatial scale of representativeness for selected pollutants.
- 10) Monitoring data spatial redundancy or gaps that need to be eliminated.
- 11) Programmatic trends or shifts in emphasis or funding that lead toward different data needs.

In order to generate the appropriate level of data necessary for this analysis the state agency should consider the following:

- 1) Statistical tools and methods
 - a) Trend analysis of line charts and bar graphs of historical pollutant concentration trends in comparison with the NAAQS
 - b) Correlation analysis to discern the similarity of measurements between individual monitoring stations on a single pollutant basis.
 - c) Principal component analysis, if applicable for a given agency.
- 2) Graphical tools and methods
 - a) Maps with multiple layers and overlays depicting:
 - a.1) Monitor locations
 - a.2) Emission inventory data
 - a.3) Population data
 - a.4) Affects of either adding or deleting a monitor from the network
 - a.5) Spatial area served by a monitoring site for a given pollutant

Appendix C: Enhanced Monitoring Plan

Background:

40 CFR Part 58 Appendix D.5(h) states:

States with Moderate and above 8-hour O₃ nonattainment areas and states in the Ozone Transport Region as defined in 40 CFR 51.900 shall develop and implement an Enhanced Monitoring Plan (EMP) detailing enhanced O₃ and O₃ precursor monitoring activities to be performed. The EMP shall be submitted to the EPA Regional Administrator no later than October 1, 2019 or two years following the effective date of a designation to a classification of Moderate or above O₃ nonattainment, whichever is later. At a minimum, the EMP shall be reassessed and approved as part of the 5-year network assessments required under 40 CFR 58.10(d). The EMP will include monitoring activities deemed important to understanding the O₃ problems in the state. Such activities may include, but are not limited to, the following:

- (1) Additional O₃ monitors beyond the minimally required under paragraph 4.1 of this appendix,*
- (2) Additional NO_x or NO_y monitors beyond those required under 4.3 of this appendix,*
- (3) Additional speciated VOC measurements including data gathered during different periods other than required under paragraph 5(g) of this appendix, or locations other than those required under paragraph 5(a) of this appendix, and*
- (4) Enhanced upper air measurements of meteorology or pollution concentrations.*

The St. Louis, MO-IL area is in nonattainment with the 2015 National Ambient Air Quality Standard for Ozone (O₃). The ozone nonattainment area was upgraded from marginal to moderate effective November 7, 2022. The initial EMP was submitted to EPA on October 11, 2024. A revised/updated EMP is included in Appendix C satisfying the requirement of 40 CFR Part 58 Appendix D.5(h).

The United States Environmental Protection Agency (US EPA) supplemented the regulatory language with an Enhanced Monitoring Program guidance document: https://www.epa.gov/sites/default/files/2019-11/documents/pams_emp_guidance.pdf.

Some examples of the research the department did to develop the plan included:

- Reviewing the regulatory language in 40 CFR Part 58 Appendix D.5(h),
- Reviewing the United States Environmental Protection Agency's (US EPA) EMP guidance document, "Technical Note – Guidance for Developing Enhanced Monitoring Plans,"
- Reviewing EMPs produced by other monitoring organizations,
- Consulting with US EPA Region 7,
- Consulting with regional planning organizations,
- Consulting with environmental advocacy groups,
- Consulting with universities, and
- Consulting with other monitoring organizations.

The research led the department to focus on evaluating the need for:

- Additional Nitrogen Dioxide (NO₂) monitoring,
- Additional O₃ monitoring,
- Evaluating Formaldehyde (HCHO) to NO₂ ratios at Blair Street,
- Continuous formaldehyde monitoring,
- Additional formaldehyde monitoring,
- Evaluating the Photochemical Assessment Monitoring Station (PAMS) data from Blair Street and consider extending the PAMS, and
- Additional meteorological monitoring.

Additional NO₂ Monitoring

40 CFR Part 58 Appendix D.4.3. requires the St. Louis Core Based Statistical Area (CBSA) to include at least four NO₂ monitors (two near road, one maximum concentration/PAMS direct NO₂, NO_y). The St. Louis CBSA currently contains eight NO₂ monitors: six operated by Missouri and two by Illinois.

The eight monitors well exceed regulatory requirements. At the time of the submittal of the EMP, the department believed additional NO₂ monitoring could provide a better understanding of O₃ in the St. Louis, MO-IL nonattainment area. As a result, the department requested and was awarded funds under the Inflation Reduction Act to purchase and install two Teledyne N500 NO₂ Direct instruments and the equipment necessary to perform automated checks on the instruments. The monitors were added to the existing West Alton and Arnold West sites in 2025. The new NO₂ monitors have been installed at the existing West Alton and Arnold West monitoring stations. The monitors are also capable of measuring Nitric Oxide (NO) and Nitrogen Oxides (NO_x). As a part of the grant application, the department committed to submitting annual reports describing any findings from the study. The department also committed to submitting a final report summarizing the findings in 2028.

Additional O₃ Monitoring

As a part of developing the original EMP, the department reviewed the O₃ network and found that additional monitors may not provide substantive benefit to understanding the O₃ problem in our area. 40 CFR Part 58 Appendix D.4.1 requires the St. Louis CBSA to include at least two O₃ monitors. Illinois and Missouri are operating six and seven O₃ monitors in the St. Louis CBSA respectively. The thirteen O₃ monitors in the St. Louis CBSA are well above the minimum network requirement. As discussed in this assessment, the department continued to find additional monitors would not provide substantive benefit.

Evaluating HCHO to NO₂ Ratios at Blair Street Using Existing PAMS Data

HCHO to NO₂ ratios can be used to determine whether an area is NO_x sensitive (reductions in NO_x would reduce ozone concentrations), Volatile Organic Compound (VOC) sensitive (reductions in VOCs would reduce ozone concentrations), or transitional (reductions in NO_x or VOCs could reduce ozone concentrations) with regards to ozone formation.

The Lake Michigan Air Directors Consortium (LADCO) published the technical report “[Ozone Formation Sensitivity to NO_x and VOC Emissions in the LADCO Region](#)” in September 2022. The report discussing findings of NO_x and VOC sensitivity across the LADCO region and included the St. Louis CBSA. LADCO’s findings for the St. Louis area was that the area was generally NO_x sensitive, but became transitional near city center. LADCO’s findings were based on a variety of approaches including using ground-based measurements at Blair Street.

Until June 2021, the Blair Street station only measured formaldehyde as a part of the National Air Toxics Trend Station (NATTS) program, which includes 1-in-6 day 24-hour formaldehyde measurements. Starting in June 2021, during PAMS season (June 1 – August 31), formaldehyde started being sampled on a 1-in-3 day 8-hour frequency. This formaldehyde sampling was in addition to the NATTS formaldehyde sampling. Additionally, prior to June 2022, NO₂ was measured using a photolytic analyzer at Blair Street. Since that time, Blair Street has been sampling using an NO₂ direct analyzer. The LADCO study only used data from 2013 through 2021.

The department now has four complete PAMS years of higher resolution formaldehyde sampling (more days of year and three 8-hour samples per day) and nearly three complete PAMS years of direct NO₂ monitoring. Given the change in data availability, the department believes it is appropriate to re-analyze the HCHO to NO₂ ratios at Blair Street to determine if that particular part of St. Louis is NO_x sensitive, VOC sensitive, or transitional. The department will generate a report of its findings every calendar year starting in 2025.

Continuous HCHO Monitoring

40 CFR Part 58 Appendix D.5. requires either three 8-hour averaged carbonyl samples per day on a 1-in-3 day schedule, or hourly averaged formaldehyde to satisfy PAMS requirements. The department is currently satisfying the requirement at Blair Street with the three 8-hour averaged carbonyl samples per day on a 1-in-3 day schedule approach; however, as a part of the original EMP, the department is considered switching to continuous formaldehyde using an instrument similar to the Picaro G2307 because the real time formaldehyde data at Blair Street could help the department improve on episode analyses and on determining NO₂/VOC sensitivity.

At the time of the issuance of the EMP, the State of New York was operating two Picaro G2307 in conjunction with a 24-hour averaged 1-in-6 day schedule carbonyl sample (TO-11A for

formaldehyde) to satisfy PAMS formaldehyde requirements. The department considered using the approach that New York was using, but at the time of the original EMP submittal, more time was needed to make a decision on whether the approach would be allowable, affordable, and beneficial.

After coordinating with US EPA Region 7, the department found that the Picaro G2307 would not likely be an approvable substitute to satisfy PAMS requirements. Data from the Picaro G3207 may still be used as a part of the EMP. Given the additional expense that would be required to continue to collect the cartridge samples and to purchase/operate the Picaro, the department does not consider this a feasible option at this time.

US EPA Region 7 proposed TO-11A as a potential alternative to the Picaro G3207 to consider, but this alternative approach would still not allow the department to sample formaldehyde in real time and as a result, the alternative approach may not achieve the department's objective.

The department may consider real time formaldehyde monitoring in the future for enhanced monitoring as technology improves and/or funds become available.

Additional HCHO Monitoring

The original EMP submitted by the department also discussed the potential for additional HCHO monitoring because the HCHO to NO₂ ratio analysis that will be performed using Blair Street data will be representative of the urban core NO_x/VOC sensitivity and may not be representative of the NO_x/VOC sensitivity farther away. Adding formaldehyde sampling at an additional location or locations outside of the urban core that include NO₂ monitoring may provide additional benefit. The department expressed interest in formaldehyde sampling at Arnold West and West Alton because both sites may provide useful insight into NO_x/VOC sensitivity as they are both away from the urban core. Additionally, formaldehyde sampling at Arnold West may be useful in further understanding the VOC impacts the Mark Twain National Forest has on the area. The department also expressed interest in formaldehyde sampling at the Pacific monitoring station as Pacific may be more representative of VOC emissions from the Mark Twain National Forest.

Unfortunately, the 24-hour average 1-in-6 day schedule and the 8-hour average 1-in-3 day schedule TO-11A carbonyl sampling continues to be too resource intensive and expensive to take on at this time.

If the department was able to move to a Picaro like instrument at Blair Street for formaldehyde and considered the switch a success (reasonable maintenance needs, accurate data, etc.), the department would consider installing a Picaro like instrument at Arnold West or West Alton. As a part of the decision making process, the department notes that operating the Picaro without the 24-hour average 1-in-6 day schedule carbonyl sample adjustment may reduce the

accuracy of the measurements (New York is currently adjusting the Picaro data in this manner). Even if the accuracy is reduced, it is possible that the real time formaldehyde data may still have value in understanding O₃ formation in the St. Louis area.

The department will continue to consider approaches for adding HCHO sampling to the network if more resources become available and/or the department finds a suitable real-time formaldehyde instrument.

Evaluate PAMS Data from Blair Street and Consider Extending the PAMS Season

Ambient concentrations of ozone and ozone precursors from the PAMS network are intended to be used to make attainment status decisions, track VOC and NO_x emission inventory reductions, better characterize the nature and extent of the ozone problem, and prepare air quality trends.

PAMS data is also intended to provide an improved database for assessing photochemical model performance, especially for future control strategy mid-course corrections as part of the continuing air quality management process.

In January of 2018, Sonoma Technology, Inc. prepared a “[PAMS Data Validation and Analysis](#)” guidance document for the US EPA. Section 4 of the document has suggestions to help agencies analyze the data in a way that agencies will better understand ozone precursors, develop effective emissions controls for reducing ozone, assess progress in reducing emissions, reconcile emission inventories, evaluate models, assess pollutant transport, and analyze trends. The department has not had an opportunity to analyze the PAMS data in this manner, but now plans to do so using the “PAMS Data Validation and Analysis” document as a guide. The department will generate a report of its findings every calendar year starting in 2025.

The department will consider extending the PAMS season if analyses of the PAMS data provides the department a better understanding of ground level ozone in the St. Louis area.

Additional Meteorological Monitoring

The department finds that the current meteorological network in the St. Louis CBSA is sufficient.

Appendix D: Monitoring Network Table

Missouri Ambient Air Monitoring Network



<i>MIC</i>	<i>Microscale (Several meters up to about 100 meters)</i>
<i>MID</i>	<i>Middle (100 meters to 0.5 kilometer)</i>
<i>NBR</i>	<i>Neighborhood (0.5 to 4.0 kilometers range)</i>
<i>URB</i>	<i>Urban (4 to 50 kilometers)</i>
<i>REG</i>	<i>Regional (Tens to hundreds of kilometers)</i>
<i>COM</i>	<i>National Ambient Air Quality Standards (NAAQS) Compliance</i>
<i>MET</i>	<i>Meteorological Data</i>
<i>N/A</i>	<i>Not Applicable</i>
<i>NCore</i>	<i>National Multi-Pollutant Monitoring Stations</i>
<i>NON-A</i>	<i>Non-Ambient Site</i>
<i>NON-R</i>	<i>Non-Regulatory</i>
<i>PQAO</i>	<i>Primary Quality Assurance Organization</i>
<i>RES</i>	<i>Research</i>
<i>SLAMS</i>	<i>State and Local Monitoring Stations</i>
<i>SIP</i>	<i>State Implementation Plan</i>
<i>SPEC</i>	<i>Speciation</i>
<i>STA</i>	<i>State Standard</i>
<i>SPM</i>	<i>Special Purpose Monitoring</i>
<i>SPP</i>	<i>Special Purpose Project</i>
<i>Coll</i>	<i>Collocated monitor. A secondary monitor at a site.</i>

Ameren Missouri (PQAO - 1440)

Labadie "Plant" Site

AQS Site Number **29-071-9003**

~1.5 km south of the Labadie Energy Center, Labadie, MO 63055

Latitude: 38.5486 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.83725 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 680

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Std Dev Hz Wind Direction	61106	Industrial	1	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (40m)
Std Dev Hz Wind Direction	61106	Industrial	2	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (60m)
Std Dev Hz Wind Direction	61106	Industrial	3	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (80m)
Std Dev Hz Wind Direction	61106	Industrial	4	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (100m)
Std Dev Hz Wind Direction	61106	Industrial	5	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (120m)
Std Dev Hz Wind Direction	61106	Industrial	6	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (140m)
Std Dev Hz Wind Direction	61106	Industrial	7	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (160m)

Std Dev Hz Wind Direction	61106	Industrial	8	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (180m)
Std Dev Hz Wind Direction	61106	Industrial	9	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (200m)
Std Dev Hz Wind Direction	61106	Industrial	10	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (220m)
Std Dev Hz Wind Direction	61106	Industrial	11	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (240m)
Std Dev Hz Wind Direction	61106	Industrial	12	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (260m)
Std Dev Hz Wind Direction	61106	Industrial	13	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (280m)
Std Dev Hz Wind Direction	61106	Industrial	14	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (300m)
Temperature Virtual	62102	Industrial	1	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (40m)
Temperature Virtual	62102	Industrial	2	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (60m)
Temperature Virtual	62102	Industrial	3	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (80m)
Temperature Virtual	62102	Industrial	4	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (100m)

Temperature Virtual	62102	Industrial	5	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (120m)
Temperature Virtual	62102	Industrial	6	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (140m)
Temperature Virtual	62102	Industrial	7	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (160m)
Temperature Virtual	62102	Industrial	8	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (180m)
Temperature Virtual	62102	Industrial	9	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (200m)
Temperature Virtual	62102	Industrial	10	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (220m)
Temperature Virtual	62102	Industrial	11	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (240m)
Temperature Virtual	62102	Industrial	12	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (260m)
Temperature Virtual	62102	Industrial	13	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (280m)
Temperature Virtual	62102	Industrial	14	☐	1	N/A	MET	017	deg C	128	Scintec MFAS Sodar/RASS Radar Profiler	Other (300m)

Wind Direction - Resultant	61104	Industrial	1	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (40m)
Wind Direction - Resultant	61104	Industrial	2	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (60m)
Wind Direction - Resultant	61104	Industrial	3	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (80m)
Wind Direction - Resultant	61104	Industrial	4	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (100m)
Wind Direction - Resultant	61104	Industrial	5	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (120m)
Wind Direction - Resultant	61104	Industrial	6	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (140m)
Wind Direction - Resultant	61104	Industrial	7	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (160m)
Wind Direction - Resultant	61104	Industrial	8	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (180m)
Wind Direction - Resultant	61104	Industrial	9	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (200m)
Wind Direction - Resultant	61104	Industrial	10	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (220m)
Wind Direction - Resultant	61104	Industrial	11	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (240m)

Wind Direction - Resultant	61104	Industrial	12	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (260m)
Wind Direction - Resultant	61104	Industrial	13	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (280m)
Wind Direction - Resultant	61104	Industrial	14	☐	1	N/A	MET	014	deg	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (300m)
Wind Speed - Resultant	61103	Industrial	1	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (40m)
Wind Speed - Resultant	61103	Industrial	2	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (60m)
Wind Speed - Resultant	61103	Industrial	3	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (80m)
Wind Speed - Resultant	61103	Industrial	4	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (100m)
Wind Speed - Resultant	61103	Industrial	5	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (120m)
Wind Speed - Resultant	61103	Industrial	6	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (140m)
Wind Speed - Resultant	61103	Industrial	7	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (160m)
Wind Speed - Resultant	61103	Industrial	8	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (180m)

Wind Speed - Resultant	61103	Industrial	9	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (200m)
Wind Speed - Resultant	61103	Industrial	10	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (220m)
Wind Speed - Resultant	61103	Industrial	11	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (240m)
Wind Speed - Resultant	61103	Industrial	12	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (260m)
Wind Speed - Resultant	61103	Industrial	13	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (280m)
Wind Speed - Resultant	61103	Industrial	14	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (300m)
WS - Sigma Theta (Vertical)	61110	Industrial	1	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (40m)
WS - Sigma Theta (Vertical)	61110	Industrial	2	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (60m)
WS - Sigma Theta (Vertical)	61110	Industrial	3	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (80m)
WS - Sigma Theta (Vertical)	61110	Industrial	4	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (100m)

WS - Sigma Theta (Vertical)	61110	Industrial	5	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (120m)
WS - Sigma Theta (Vertical)	61110	Industrial	6	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (140m)
WS - Sigma Theta (Vertical)	61110	Industrial	7	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (160m)
WS - Sigma Theta (Vertical)	61110	Industrial	8	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (180m)
WS - Sigma Theta (Vertical)	61110	Industrial	9	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (200m)
WS - Sigma Theta (Vertical)	61110	Industrial	10	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (220m)
WS - Sigma Theta (Vertical)	61110	Industrial	11	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (240m)
WS - Sigma Theta (Vertical)	61110	Industrial	12	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (260m)
WS - Sigma Theta (Vertical)	61110	Industrial	13	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (280m)
WS - Sigma Theta (Vertical)	61110	Industrial	14	☐	1	N/A	MET	011	m/s	127	Scintec MFAS Sodar/RASS Acoustic Sounder	Other (300m)

Labadie, North

AQS Site Number29-183-9004

~150 ft. north of Terry Rd and ~200 ft. Kingfisher Ct, Augusta, MO 63332

Latitude: 38.59557 AQCR: 070 Metropolitan St. Louis

Longitude: -90.82864 MSA: 7040 St. Louis, MO-IL

Elevation (ft): 816

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	100	Ultra-violet Fluorescence	Source Oriented
Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	100	Ultra-violet Fluorescence	Source Oriented

Labadie, Northwest

AQS Site Number29-183-9002

Rt. 94, Augusta, MO 63332 near the intersection with Schluersburg Road

Latitude: 38.5818 AQCR: 070 Metropolitan St. Louis

Longitude: -90.865528 MSA: 7040 St. Louis, MO-IL

Elevation (ft): 550

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Outdoor Temperature	62101	Industrial	2	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (10m Probe Height)
Outdoor Temperature	62101	Industrial	3	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (2m Probe Height)
Outdoor Temperature Diff	62106	Industrial	1	☐	1	N/A	MET	116	Temp Diff deg C	041	Instrumental: Elect or Mach Avg Lev 2-Lev1	Other (10m - 2m Probe Heights)

Relative Humidity	62201	Industrial	1	☐	1	N/A	MET	019	%humidity	061	Met One 083D	Other
Std Dev Hz Wind Direction	61106	Industrial	1	☐	1	N/A	MET	014	deg	063	Arithmetic Standard Deviation	Other (10m Tower)
Std Dev Vt Wind Direction	61107	Industrial	1	☐	1	N/A	MET	014	deg	020	Arithmetic Standard Deviation	Other (10m Tower)
Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	100	Ultra-violet Fluorescence	Source Oriented
Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	100	Ultra-violet Fluorescence	Source Oriented
Wind Direction - Resultant	61104	Industrial	1	☐	1	N/A	MET	014	deg	020	Vector Summation	Other (10m Tower)
Wind Direction - Scalar	61102	Industrial	1	☐	1	N/A	MET	014	deg	063	Climatronics	Other (10m Tower)
Wind Speed - Resultant	61103	Industrial	1	☐	1	N/A	MET	011	m/s	020	Vector Summation	Other (10m Tower)
Wind Speed - Scalar	61101	Industrial	1	☐	1	N/A	MET	011	m/s	063	Climatronics	Other (10m Tower)

Wind Speed - Vertical	61109	Industrial	1	☐	1	N/A	MET	011	m/s	020	Electronic Averaging	Other (10m Tower)
WS - Sigma Theta (Vertical)	61110	Industrial	1	☐	1	N/A	MET	011	m/s	020	Arithmetic Standard Deviation	Other (10m Tower)

Labadie, Southwest

AQS Site Number **29-071-9002**

870 Albertina Lane, Labadie, MO 63055

Latitude: 38.52825 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.86301 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 630

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	100	Ultra-violet Fluorescence	Source Oriented
Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	100	Ultra-violet Fluorescence	Source Oriented

Labadie, Valley Site

AQS Site Number **29-071-9001**

2901 Labadie Bottom Road, Labadie, MO 63055

Latitude: 38.572522 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.796911 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 525

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Barometric Pressure	64101	Industrial	1	☐	1	N/A	MET	016	Millbars	015	Instrumental-Barometric Press Transducer	Other

Outdoor Temperature	62101	Industrial	2	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (10m Probe Height)
Outdoor Temperature	62101	Industrial	3	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (2m Probe Height)
Outdoor Temperature Diff	62106	Industrial	1	☐	1	N/A	MET	116	Temp Diff deg C	041	Instrumental: Elect or Mach Avg Lev 2-Lev1	Other (10m - 2m Probe Heights)
Precipitation	65102	Industrial	1	☐	1	N/A	MET	021	inches	014	Heated Tipping Bucket	Other
Relative Humidity	62201	Industrial	1	☐	1	N/A	MET	019	%humidity	061	Met One 083D	Other
Solar Radiation	63301	Industrial	1	☐	1	N/A	MET	079	W/m^2	011	Instrumental-Pyranometer	Other
Std Dev Hz Wind Direction	61106	Industrial	1	☐	1	N/A	MET	014	deg	063	Arithmetic Standard Deviation	Other (10m Tower)
Std Dev Vt Wind Direction	61107	Industrial	1	☐	1	N/A	MET	014	deg	020	Arithmetic Standard Deviation	Other (10m Tower)
Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	100	Ultra-violet Fluorescence	Source Oriented

Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	100	Ultra-violet Fluorescence	Source Oriented
Wind Direction - Resultant	61104	Industrial	1	☐	1	N/A	MET	014	deg	020	Vector Summation	Other (10m Tower)
Wind Direction - Scalar	61102	Industrial	1	☐	1	N/A	MET	014	deg	063	Climatronics	Other (10m Tower)
Wind Speed - Resultant	61103	Industrial	1	☐	1	N/A	MET	011	m/s	020	Vector Summation	Other (10m Tower)
Wind Speed - Scalar	61101	Industrial	1	☐	1	N/A	MET	011	m/s	063	Climatronics	Other (10m Tower)
Wind Speed - Vertical	61109	Industrial	1	☐	1	N/A	MET	011	m/s	020	Electronic Averaging	Other (10m Tower)
WS - Sigma Theta (Vertical)	61110	Industrial	1	☐	1	N/A	MET	011	m/s	020	Arithmetic Standard Deviation	Other (10m Tower)

Doe Run Buick (PQAO - 1290)

County Road 75

AQS Site Number **29-093-9010**

98 Iron County Road, Bixby, MO 65439

Latitude: 37.64876 **AQCR:** 138 SE Missouri

Longitude: -91.14980 **MSA:** 0000 Not in an MSA

Elevation (ft): 1365

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State- Obj</i>	<i>AQS Unit- Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
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Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
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Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
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Doe Run Buick - Buick NE

AQS Site Number **29-093-9008**

346 Power Lane, Bixby West, MO 65439

Latitude: 37.65214 **AQCR:** 138 SE Missouri

Longitude: -91.11689 **MSA:** 0000 Not in an MSA

Elevation (ft): 1423

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State- Obj</i>	<i>AQS Unit- Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
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Lead (TSP) - LC FRM/FEM 14129		Industrial	1	☐	1/1	MID	COM	105	ug/m^3-LC	192	Inductive Coupled Plasma Spectrometry	Source Oriented
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Doe Run Buick - North #5 (NON-A)

AQS Site Number **29-093-0021**

Doe Run Buick - North#5, Buick, MO 65439

Latitude: 37.65178 **AQCR:** 138 SE Missouri
Longitude: -91.13094 **MSA:** 0000 Not in an MSA
Elevation (ft): 1443

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Lead (TSP) - LC FRM/FEM 14129	Industrial	1	☐	1/6	MID	SIP	105	ug/m^3-LC	192	Inductive Coupled Plasma Spectrometry	Source Oriented
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Doe Run Buick - South #1 (NON-A)

AQS Site Number **29-093-0016**

Doe Run Buick - South#1, Buick, MO 65439

Latitude: 37.62400 **AQCR:** 138 SE Missouri
Longitude: -91.12827 **MSA:** 0000 Not in an MSA
Elevation (ft): 1502

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Lead (TSP) - LC FRM/FEM 14129	Industrial	1	☐	1/6	MID	SIP	105	ug/m^3-LC	192	Inductive Coupled Plasma Spectrometry	Source Oriented
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Lead (TSP) - LC FRM/FEM 14129	Industrial	2	☒	1/6	MID	SIP	105	ug/m^3-LC	192	Inductive Coupled Plasma Spectrometry	Quality Assurance (Collocation)
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Hwy 32 Northeast

AQS Site Number **29-093-9009**

1582 Highway 32, Bixby, MO 65439

Latitude: 37.65319 **AQCR:** 138 SE Missouri
Longitude: -91.12795 **MSA:** 0000 Not in an MSA
Elevation (ft): 1384

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented

West Entrance

AQS Site Number29-093-9011

18594 Hwy KK, Boss, MO 65440

Latitude: 37.63211 AQCR: 138 SE Missouri

Longitude: -91.13565 MSA: 0000 Not in an MSA

Elevation (ft): 1463

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State- Obj	AQS Unit- Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented

Doe Run Herculaneum (PQAO - 1290)

Herculaneum, City Hall (Mott Street)

AQS Site Number **29-099-0020**

360 Short Street, Herculaneum, MO, 63048

Latitude: 38.263394 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.379667 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 468

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Lead (TSP) - LC FRM/FEM 14129		Industrial	1	☐	1/3	MID	COM	105	ug/m^3-LC	192	Inductive Coupled Plasma Spectrometry	Source Oriented & Highest Concentration
Lead (TSP) - LC FRM/FEM 14129		Industrial	2	☒	1/6	MID	COM	105	ug/m^3-LC	192	Inductive Coupled Plasma Spectrometry	Quality Assurance (Collocation)

Herculaneum, Dunklin High School

AQS Site Number **29-099-9002**

1 Black cat Dr., Herculaneum, MO, 63048

Latitude: 38.26703 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.37875 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 445

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Lead (TSP) - LC FRM/FEM 14129		Industrial	1	☐	1/6	NBR	COM	105	ug/m^3-LC	192	Inductive Coupled Plasma Spectrometry	Source Oriented and Population Exposure

North Cross, Herculaneum, MO 63048

Latitude: 38.26216 *AQCR:* 070 Metropolitan St. Louis

Longitude: -90.38126 *MSA:* 7040 St. Louis, MO-IL

Elevation (ft): 463

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State- Obj</i>	<i>AQS Unit- Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
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Lead (TSP) - LC FRM/FEM 14129	Industrial	1	☐	1/6	NBR	COM	105	ug/m^3-LC	192	Inductive Coupled Plasma Spectrometry	Source Oriented & Population Exposure
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Environmental Services Program (ESP) [PQAO - 0588]

Alba

AQS Site Number **29-097-0004**

20400 Millwood Rd., Alba, MO 64830

Latitude: 37.2385 **AQCR:** 139 SW Missouri

Longitude: -94.42468 **MSA:** 3710 Joplin, MO

Elevation (ft): 965

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Max Ozone Concentration & Population Exposure
Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	-

Arnold West

AQS Site Number **29-099-0019**

1709 Lonedell Dr., Arnold, MO 63010

Latitude: 38.44862 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.3958 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 639

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Ammonium Ion PM2.5 LC	88301	SLAMS	6	☐	1/6	NBR	RES	105	ug/m^3-LC	812	Met One SASS Nylon	Population Exposure (UC-Davis)

Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Nitric Oxide	42601	SPM	1	☐	H	NBR	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
Nitrogen Dioxide	42602	SPM	1	☐	H	NBR	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
OP CSN_Rev Undj PM2.5 LC TOR	88378	SLAMS	6	☐	1/6	NBR	RES	105	ug/m^3-LC	842	URG 3000N w/Pall Quartz filter & Cyclone Inlet	Population Exposure (UC-Davis)
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
Oxides of Nitrogen (Nox)	42603	SPM	1	☐	H	NBR	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Population Exposure
Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	-

PM10 - STP FRM/FEM	81102	SLAMS	3	☐	1	NBR	COM	001	ug/m^3	079	R&P SA246B TEOM	Population Exposure
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Population Exposure
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10m Tower)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (10m Tower)

Blair Street

AQS Site Number29-510-0085

3247 Blair Street, St. Louis, MO 63107

Latitude: 38.65638 AQCR: 070 Metropolitan St. Louis

Longitude: -90.19825 MSA: 7040 St. Louis, MO-IL

Elevation (ft): 492

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
1,2,3-trimethylbenzene	45225	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
1,2,4-trimethylbenzene	45208	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact

1-butene	43280	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
2,2,4-trimethylpentane	43250	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Acetaldehyde	43503	PAMS	1	☐	1	URB	PAMS	078	ppbC	202	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Ammonium Ion PM2.5 LC	88301	SPM	6	☐	1/3	NBR	RES	105	ug/m^3-LC	812	Met One SASS Nylon	
Barometric Pressure	64101	SLAMS	1	☐	1	NBR	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Benzene	45201	PAMS	6	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Black Carbon PM2.5 LC	88313	SLAMS	1	☐	1	NBR	RES	105	ug/m^3-LC	894	Magee Scientific TAPI M633 Aethalometer	Population Exposure
Carbon Monoxide	42101	NCORE	1	☐	1	NBR	COM	007	ppm	593	Teledyne T300U	Population Exposure
cis-2-butene	43217	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact

Ethane	43202	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Ethylbenzene	45203	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Ethylene	43203	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Formaldehyde	43502	PAMS	1	☐	1	URB	PAMS	078	ppbC	202	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Indoor Temperature	62107	SLAMS	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other (Large Shelter)
Indoor Temperature	62107	SLAMS	2	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other (Small Shelter)
Isobutane	43214	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Isopentane	43221	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Isoprene	43243	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact

Lead PM10 LC	85128	SPM	6	☐	1/6	NBR	RES	108	ng/m^3-LC	907	R&P Partisol 2025 Teflon	Population Exposure (ERG)
Lead PM10 LC	85128	SPM	7	☒	1/6	NBR	RES	108	ng/m^3-LC	907	R&P Partisol 2025 Teflon	Population Exposure (ERG)
M&P-xylenes	45109	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
M-ethyltoluene	45212	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
N-butane	43212	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
N-hexane	43231	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Nitric Oxide	42601	NCORE	1	☐	1	NBR	COM	008	ppb	699	Teledyne API 200 EU/501	Population Exposure
Nitric Oxide	42601	SLAMS	3	☐	1	NBR	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
Nitrogen Dioxide	42602	SLAMS	3	☐	1	NBR	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
N-pentane	43220	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact

O-ethyltoluene	45211	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
OP CSN_Rev Undj PM2.5 LC TOR	88378	SPM	6	☐	1/3	NBR	RES	105	ug/m^3-LC	842	URG 3000N w/Pall Quartz filter & Cyclone Inlet	Highest Concentration (UC-Davis)
Oxides of Nitrogen (Nox)	42603	SLAMS	3	☐	1	NBR	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
Ozone	44201	NCORE	1	☐	1	NBR	COM	007	ppm	087	Ultraviolet Absorption	Population Exposure
Ozone	44201	NCORE	2	☒	1	NBR	COM	007	ppm	087	Ultraviolet Absorption	-
PM10 - LC/FEM/NonFEM	85101	SPM	6	☐	1	NBR	RES	105	ug/m^3-LC	639	Teledyne API T640x	Population Exposure
PM10 - STP FRM/FEM	81102	SLAMS	6	☐	1	NBR	RES	001	ug/m^3	639	Teledyne API T640x	Population Exposure
PM2.5 - LC FRM/FEM	88101	NCORE	2	☐	1/3	NBR	COM	105	ug/m^3-LC	145	R&P 2025 Sequential w/VSCC	Quality Assurance (Collocation)
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Population Exposure

PM2.5 - LC FRM/FEM	88101	SPM	6	☐	1	NBR	RES	105	ug/m^3-LC	638	Teledyne API T640x	Population Exposure
PMCoarse - LC FRM/FEM	86101	NCORE	6	☐	1	NBR	RES	105	ug/m^3-LC	640	Teledyne API T640x	Population Exposure
Precipitation	65102	PAMS	1	☐	1	NBR	MET	021	inches	014	Heated Tipping Bucket	Max precursor emissions impact
Propylene	43205	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Reactive Oxides of N (Noy)	42600	NCORE	1	☐	1	NBR	COM	008	ppb	699	Teledyne API 200 EU/501	Population Exposure
Relative Humidity	62201	NCORE	1	☐	1	N/A	MET	019	%humidity	130	RM Young	Other
Solar Radiation	63301	SLAMS	1	☐	1	N/A	MET	079	W/m^2	011	Instrumental-Pyranometer	Other
Std Dev Hz Wind Direction	61106	SPM	1	☐	1	N/A	MET	014	deg	020	Arithmetic Standard Deviation	Other (10m Tower)
Styrene	45220	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact

Sulfur Dioxide	42401	NCORE	1	☐	1	NBR	COM	008	ppb	560	Pulsed Fluorescent 43i-TLE	Population Exposure
Sulfur Dioxide Max 5-min Avg	42406	NCORE	1	☐	1	NBR	COM	008	ppb	560	Pulsed Fluorescent	Population Exposure
Toluene	45202	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Trans-2-butene	43216	PAMS	1	☐	1	URB	PAMS	078	ppbC	128	CAS Auto-Gas Chromatograph	Max precursor emissions impact
Ultraviolet Radiation	63302	PAMS	1	☐	1	NBR	MET	079	W/m^2	011	UV Radiometer (Photometer)	Max precursor emissions impact
UV Carbon PM2.5 LC	88314	SLAMS	1	☐	1	NBR	RES	105	ug/m^3-LC	894	Magee Scientific TAPI M633 Aethalometer	Population Exposure
Wind Direction - Resultant	61104	NCORE	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10m Tower)
Wind Speed - Resultant	61103	NCORE	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (10m Tower)

Bonne Terre

AQS Site Number **29-186-0005**

15797 Highway D, Bonne Terre, MO 63628

Latitude: 37.90084 **AQCR:** 138 SE Missouri

Longitude: -90.42388 **MSA:** 0000 Not in an MSA

Elevation (ft): 840

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	REG	COM	007	ppm	047	Ultraviolet Photometric	Regional Transport
Ozone	44201	SLAMS	2	☒	1	REG	COM	007	ppm	047	Ultraviolet Photometric	-
Solar Radiation	63301	SPM	1	☐	1	N/A	MET	079	W/m^2	011	Instrumental-Pyranometer	Other

Branch Street

AQS Site Number **29-510-0093**

100 Branch St., St. Louis, MO 63102

Latitude: 38.65643 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.18977 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 429

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other

Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
PM10 - LC/FEM/NonFEM	85101	SPM	6	☐	1	NBR	RES	105	ug/m^3-LC	639	Teledyne API T640x	Source Oriented
PM10 - STP FRM/FEM	81102	SLAMS	6	☐	1	MID	RES	105	ug/m^3-LC	639	Teledyne API T640x	Source Oriented
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	MID	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Source Oriented
PM2.5 - LC FRM/FEM	88101	SPM	6	☐	1	NBR	RES	105	ug/m^3-LC	638	Teledyne API T640x	Source Oriented
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other
Std Dev Hz Wind Direction	61106	SPM	1	☐	1	N/A	MET	014	deg	020	Arithmetic Standard Deviation	Other (10m Tower)
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10m Tower)

Wind Speed - Resultant 61103 SPM 1 ☐ 1 N/A MET 012 mph 065 Instrumental: RM Young Model 05305 Other (10m Tower)

Buick NE

AQS Site Number 29-093-0034

346 Power Lane, Bixby West, MO 65439

Latitude: 37.65212 **AQCR:** 138 SE Missouri

Longitude: -91.11653 **MSA:** 0000 Not in an MSA

Elevation (ft): 1423

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Lead (TSP) - LC FRM/FEM 14129		SLAMS	1	☐	1/6	MID	COM	105	ug/m^3-LC	813	Inductively Coupled Plasma Mass Spectroscopy	Source Oriented & Highest Concentration
Lead (TSP) - LC FRM/FEM 14129		SLAMS	2	☒	1/6	MID	COM	105	ug/m^3-LC	813	Inductively Coupled Plasma Mass Spectroscopy	Quality Assurance (Collocation)
Sulfur Dioxide	42401	SPM	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
Sulfur Dioxide Max 5-min Avg	42406	SPM	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
Wind Direction - Resultant	61104	SPM	1	☐	1	NBR	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10 meters)

Wind Speed - Resultant 61103 SPM 1 ☐ 1 NBR MET 012 mph 065 Instrumental: RM Young Model 05305 Other (10 meters)

Carthage

AQS Site Number **29-097-0003**

530 Juniper, Carthage, MO 64836

Latitude: 37.19822 **AQCR:** 139 SW Missouri

Longitude: -94.31702 **MSA:** 3710 Joplin, MO

Elevation (ft): 986

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
PM10 - STP FRM/FEM	81102	SLAMS	3	☐	1	MID	COM	001	ug/m^3	079	R&P SA246B TEOM	Source Oriented
PM10 - STP FRM/FEM	81102	SLAMS	4	☒	1	MID	COM	001	ug/m^3	079	R&P SA246B TEOM	Quality Assurance (Collocation)
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (5.5 meters)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (5.5 meters)

Dunklin High School

AQS Site Number **29-099-0005**

1 Black Cat Dr., Herculaneum, MO, 63048

Latitude: 38.26703 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.37875 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 445

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Lead (TSP) - LC FRM/FEM 14129		SLAMS	1	☐	1/6	NBR	COM	105	ug/m^3-LC	813	Inductively Coupled Plasma Mass Spectroscopy	Source Oriented

El Dorado Springs

AQS Site Number **29-039-0001**

Highway 97 & Barnes Road, El Dorado Springs, MO 64744

Latitude: 37.70097 **AQCR:** 139 SW Missouri

Longitude: -94.03474 **MSA:** 0000 Not in an MSA

Elevation (ft): 965

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
Ozone	44201	SLAMS	1	☐	1	REG	COM	007	ppm	047	Ultraviolet Photometric	Regional Transport

Ozone	44201	SLAMS	2	☒	1	REG	COM	007	ppm	047	Ultraviolet Photometric	-
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	REG	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Regional Transport
Relative Humidity	62201	SPM	2	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (5.5 meters)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (5.5 meters)

Farrar

AQS Site Number29-157-0001

County Rd. 342, Farrar, MO 63746

Latitude: 37.70264
AQCR: 138
SE Missouri

Longitude: -89.698640
MSA: 0000
Not in an MSA

Elevation (ft): 497

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Max Ozone Concentration & Extreme Downwind

Ozone 44201 SLAMS 2 ☒ 1 NBR COM 007 ppm 047 Ultraviolet Photometric -

Fellows Lake AQS Site Number **29-077-0042**

4208 E. Farm Rd. 66, Springfield, MO 65803

Latitude: 37.319254 **AQCR:** 139 SW Missouri

Longitude: -93.214758 **MSA:** 7920 Springfield, MO

Elevation (ft): 1346

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	URB	COM	007	ppm	047	Ultraviolet Photometric	Max Ozone Concentration & Population Exposure
Ozone	44201	SLAMS	2	☒	1	URB	COM	007	ppm	047	Ultraviolet Photometric	-

Finger Lakes AQS Site Number **29-019-0011**

1505 E. Peabody Road, Columbia, MO 65202

Latitude: 39.07803 **AQCR:** 137 Northern Missouri

Longitude: -92.31632 **MSA:** 1740 Columbia, MO

Elevation (ft): 726

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other

Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Max Ozone Concentration & Population Exposure
Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	-

Foley West

AQS Site Number29-113-0004

2100 Highway Y Foley, MO 63347

Latitude: 39.04577 AQCR: 137 Northern Missouri

Longitude: -90.84927 MSA: 7040 St. Louis, MO-IL

Elevation (ft): 715

Parameter	AQS Code	AQS Monitor Type	AQS POC	AQS Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Extreme Downwind

Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	-
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Forest City, Exide Levee

AQS Site Number29-087-0008

25942 Hwy 111, Forest City, MO 64451

Latitude: 40.027222 AQCR: 137 Northern Missouri

Longitude: -95.235833 MSA: 0000 Not in an MSA

Elevation (ft): 904

Parameter	AQS Code	AQS Monitor Type	AQS POC	AQS Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Lead (TSP) - LC FRM/FEM 14129

SLAMS

1

☐

1/6

MID

COM

105

ug/m^3-LC

813

Inductively
Coupled Plasma
Mass
Spectroscopy

Source
Oriented

Forest Park

AQS Site Number29-510-0094

5600 Clayton Avenue, St. Louis, MO 63110

Latitude: 38.63114 AQCR: 070 Metropolitan St. Louis

Longitude: -90.28115 MSA: 7040 St. Louis, MO-IL

Elevation (ft): 551

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State- Obj	AQS Unit- Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental- Barometric Sensor	Other
Black Carbon PM2.5 LC	88313	SPM	1	☐	1	MIC	COM	105	ug/m^3-LC	894	Magee Scientific TAPI M633 Aethalometer	Source Oriented
Carbon Monoxide	42101	SLAMS	1	☐	1	MIC	COM	007	ppm	554	Gas Filter Corr Thermo Electron 48i TLE	Source Oriented
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Nitric Oxide	42601	SPM	1	☐	1	MIC	COM	008	ppb	256	Teledyne API Model N500	Source Oriented
Nitrogen Dioxide	42602	SLAMS	1	☐	1	MIC	COM	008	ppb	256	Teledyne API Model N500	Source Oriented

Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
Outdoor Temperature	62101	SPM	2	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (10m Probe Height)
Outdoor Temperature	62101	SPM	3	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (2m Probe Height)
Outdoor Temperature Diff	62106	SPM	1	☐	1	N/A	MET	116	Temp Diff deg C	041	Instrumental: Elect or Mach Avg Lev 2-Lev1	Other (10m - 2m Probe Height)
Oxides of Nitrogen (Nox)	42603	SPM	1	☐	1	MIC	COM	008	ppb	256	Teledyne API Model N500	Source Oriented
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	MIC	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Source Oriented
PM2.5 - LC FRM/FEM	88101	SPM	6	☐	1	MIC	COM	105	ug/m^3-LC	636	Teledyne API T640	Source Oriented
Precipitation	65102	SPM	1	☐	1	N/A	MET	021	inches	014	Heated Tipping Bucket	Other
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other
Solar Radiation	63301	SLAMS	1	☐	1	N/A	MET	079	W/m^2	011	Instrumental-Pyranometer	Other

Std Dev Hz Wind Direction	61106	SPM	1	☐	1	N/A	MET	014	deg	020	Arithmetic Standard Deviation	Other (10m Tower)
UV Carbon PM2.5 LC	88314	SPM	1	☐	1	MIC	COM	105	ug/m^3-LC	894	Magee Scientific TAPI M633 Aethalometer	Source Oriented
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10m Tower)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (10m Tower)

Front Street

AQS Site Number **29-095-0018**

1331 N. Jackson, Kansas City, MO 64120

Latitude: 39.13198 **AQCR:** 094 Metropolitan Kansas City

Longitude: -94.52137 **MSA:** 3760 Kansas City, MO-KS

Elevation (ft): 728

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>AQS Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
PM10 - STP FRM/FEM	81102	SLAMS	3	☐	1	NBR	COM	001	ug/m^3	079	R&P SA246B TEOM	Highest Concentration & Population Exposure

Herculaneum, Mott Street

AQS Site Number **29-099-0027**

747 Mott St., Herculaneum, MO, 63048

Latitude: 38.263394 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.379667 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 468

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Lead (TSP) - LC FRM/FEM 14129		SLAMS	1	☐	1/3	MID	COM	105	ug/m^3-LC	813	Inductively Coupled Plasma Mass Spectroscopy	Source Oriented & Highest Concentration
Lead (TSP) - LC FRM/FEM 14129		SLAMS	2	☒	1/6	MID	COM	105	ug/m^3-LC	813	Inductively Coupled Plasma Mass Spectroscopy	Quality Assurance (Collocation)
Sulfur Dioxide	42401	SLAMS	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented & Highest Concentration
Sulfur Dioxide Max 5-min Avg	42406	SPM	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented & Highest Concentration
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (5.5 meters)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (5.5 meters)

Herculaneum, Sherman

AQS Site Number **29-099-0013**

460 Sherman St., Herculaneum, MO, 63048

Latitude: 38.27170 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.37658 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 462

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Lead (TSP) - LC FRM/FEM 14129		SLAMS	1	☐	1/6	NBR	COM	105	ug/m^3-LC	813	Inductively Coupled Plasma Mass Spectroscopy	Source Oriented

Hillcrest High School

AQS Site Number **29-077-0036**

3319 N. Grant, Springfield, MO 65803

Latitude: 37.25607 **AQCR:** 139 SW Missouri

Longitude: -93.29970 **MSA:** 7920 Springfield, MO

Elevation (ft): 1321

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
Ozone	44201	SLAMS	1	☐	1	URB	COM	007	ppm	047	Ultraviolet Photometric	Population Exposure

Ozone	44201	SLAMS	2	☒	1	URB	COM	007	ppm	047	Ultraviolet Photometric	-
PM10 - LC/FEM/NonFEM	85101	SLAMS	6	☐	1	NBR	RES	105	ug/m^3-LC	639	Teledyne API T640x	Population Exposure
PM10 - STP FRM/FEM	81102	SLAMS	6	☐	1	NBR	RES	105	ug/m^3-LC	639	Teledyne API T640x	Population Exposure
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Population Exposure
PM2.5 - LC FRM/FEM	88101	SPM	6	☐	1	NBR	RES	105	ug/m^3-LC	638	Teledyne API T640x	Population Exposure
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other

Ladue

AQS Site Number29-189-3001

73 Hunter Ave., Ladue, MO 63124

Latitude: 38.65028 AQCR: 070 Metropolitan St. Louis

Longitude: -90.35021 MSA: 7040 St. Louis, MO-IL

Elevation (ft): 511

Parameter	AQS Code	AQS Monitor Type	AQS POC Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
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Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Population Exposure
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other

Liberty
AQS Site Number29-047-0005

Highway 33 & County Home Rd., Liberty, MO 64068

Latitude: 39.30314 AQCR: 094 Metropolitan Kansas City

Longitude: -94.37678 MSA: 3760 Kansas City, MO-KS

Elevation (ft): 941

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)

Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Population Exposure
Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	-
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Population Exposure
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other
Solar Radiation	63301	SPM	1	☐	1	N/A	MET	079	W/m^2	011	Instrumental-Pyranometer	Other

Linden Hills

AQS Site Number29-095-0043

1076 E 103rd St. Kansas City, Mo 64131

Latitude: 38.940794 AQCR: 094 Metropolitan Kansas City

Longitude: -94.578508 MSA: 3760 Kansas City, MO-KS

Elevation (ft): 919

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Black Carbon PM2.5 LC	88313	SPM	1	☐	1	MIC	COM	105	ug/m^3-LC	894	Magee Scientific TAPI M633 Aethalometer	Source Oriented

Carbon Monoxide	42101	SLAMS	1	☐	1	MIC	COM	007	ppm	554	Gas Filter Corr Thermo Electron 48i TLE	Source Oriented
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Nitric Oxide	42601	SPM	1	☐	1	MIC	COM	008	ppb	074	Chemiluminescen ce	Source Oriented
Nitrogen Dioxide	42602	SLAMS	1	☐	1	MIC	COM	008	ppb	074	Chemiluminescen ce	Source Oriented
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
Outdoor Temperature	62101	SPM	2	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (10m Probe Height)
Outdoor Temperature	62101	SPM	3	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (2m Probe Height)
Outdoor Temperature Diff	62106	SPM	1	☐	1	N/A	MET	116	Temp Diff deg C	041	Instrumental: Elect or Mach Avg Lev 2-Lev1	Other (10m - 2m Probe Height)
Oxides of Nitrogen (Nox)	42603	SPM	1	☐	1	MIC	COM	008	ppb	074	Chemiluminescen ce	Source Oriented
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	MIC	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Source Oriented

Precipitation	65102	SPM	1	☐	1	N/A	MET	021	inches	014	Heated Tipping Bucket	Other
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other
Solar Radiation	63301	SLAMS	1	☐	1	N/A	MET	079	W/m^2	011	Instrumental-Pyranometer	Other
Std Dev Hz Wind Direction	61106	SPM	1	☐	1	N/A	MET	014	deg	020	Arithmetic Standard Deviation	Other (10m Tower)
UV Carbon PM2.5 LC	88314	SPM	1	☐	1	MIC	COM	105	ug/m^3-LC	894	Magee Scientific TAPI M633 Aethalometer	Source Oriented
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10m Tower)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (10m Tower)

Mark Twain State Park
AQS Site Number29-137-0001

20057 State Park Office Rd., Stoutsville, MO 65283

Latitude: 39.474906 AQCR: 137 Northern Missouri

Longitude: -91.78878 MSA: 0000 Not in an MSA

Elevation (ft): 710

Parameter	AQS Code	AQS Monitor Type	AQS POC	AQS Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Nitric Oxide	42601	SPM	1	☐	1	REG	COM	008	ppb	074	Chemiluminescence	General/Background
Nitrogen Dioxide	42602	SPM	1	☐	1	REG	COM	008	ppb	074	Chemiluminescence	General/Background
Oxides of Nitrogen (Nox)	42603	SPM	1	☐	1	REG	COM	008	ppb	074	Chemiluminescence	General/Background
Ozone	44201	SLAMS	1	☐	1	REG	COM	007	ppm	047	Ultraviolet Photometric	General/Background
Ozone	44201	SLAMS	2	☒	1	REG	COM	007	ppm	047	Ultraviolet Photometric	-
PM10 - STP FRM/FEM	81102	SPM	3	☐	1	REG	SIP	001	ug/m^3	079	R&P SA246B TEOM	General/Background
Sulfur Dioxide	42401	SPM	1	☐	1	REG	SIP	008	ppb	100	Ultra-violet Fluorescence	General/Background
Sulfur Dioxide Max 5-min Avg	42406	SPM	1	☐	1	REG	COM	008	ppb	100	Ultra-violet Fluorescence	General/Background

Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10m Tower)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (10m Tower)

Maryland Heights

AQS Site Number **29-189-0014**

13044 Marine Ave., Maryland Heights, MO 63146

Latitude: 38.71085 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.47606 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 607

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Population Exposure
Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	-

New Bloomfield

AQS Site Number **29-027-0002**

2625 Meadow Lake View, New Bloomfield, MO, 65063

Latitude: 38.70608 **AQCR:** 137 Northern Missouri

Longitude: -92.09308 **MSA:** 0000 Not in an MSA

Elevation (ft): 860

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Max Ozone Concentration & Population Exposure
Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	-

Oates

AQS Site Number29-179-0034

13155 Highway KK, Boss, MO 65440

Latitude: 37.56485 AQCR: 138 SE Missouri

Longitude: -91.11423 MSA: 0000 Not in an MSA

Elevation (ft): 1134

Parameter	AQS Code	AQS Monitor Type	AQS POC	AQS Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Lead (TSP) - LC FRM/FEM 14129	SLAMS	1	☐	1/6	NBR	COM	105	ug/m^3-LC	813	Inductively Coupled Plasma Mass Spectroscopy	Source Oriented
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Orchard Farm

AQS Site Number29-183-1004

2165 Highway V, St. Charles, MO 63301

Latitude: 38.8994 AQCR: 070 Metropolitan St. Louis

Longitude: -90.44917 MSA: 7040 St. Louis, MO-IL

Elevation (ft): 441

Parameter	AQS Code	AQS Monitor Type	AQS POC	AQS Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
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Ozone	44201	SLAMS	1	☐	1	URB	COM	007	ppm	047	Ultraviolet Photometric	Extreme Downwind
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Ozone	44201	SLAMS	2	☒	1	URB	COM	007	ppm	047	Ultraviolet Photometric	-
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Pacific

AQS Site Number**29-189-0005**

18701 Old Highway 66, Pacific, MO 63069

Latitude: 38.49011 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.70509 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 524

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
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Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Population Exposure
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Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	-
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Richards Gebaur-South

AQS Site Number**29-037-0003**

1802 E. 203rd Street, Belton, MO, 64012

Latitude: 38.75961 **AQCR:** 094 Metropolitan Kansas City

Longitude: -94.57983 **MSA:** 3760 Kansas City, MO-KS

Elevation (ft): 1082

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	087	Ultraviolet Absorption	Population Exposure
Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	087	Ultraviolet Absorption	-
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Population Exposure
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10m Tower)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (10m Tower)

Rider Trail, I-70

AQS Site Number **29-189-0016**

13080 Hollenberg Drive, Bridgeton, MO 63044

Latitude: 38.75264 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.44884 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 515

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Nitric Oxide	42601	SPM	1	☐	1	MIC	COM	008	ppb	074	Chemiluminescence	Source Oriented
Nitrogen Dioxide	42602	SLAMS	1	☐	1	MIC	COM	008	ppb	074	Chemiluminescence	Source Oriented
Outdoor Temperature	62101	SPM	2	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (10m Probe Height)
Outdoor Temperature	62101	SPM	3	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (2m Probe Height)
Outdoor Temperature Diff	62106	SPM	1	☐	1	N/A	MET	116	Temp Diff deg C	041	Instrumental: Elect or Mach Avg Lev 2-Lev1	Other (10m - 2m Probe Height)

Oxides of Nitrogen (Nox)	42603	SPM	1	☐	1	MIC	COM	008	ppb	074	Chemiluminescence	Source Oriented
Precipitation	65102	SPM	1	☐	1	N/A	MET	021	inches	014	Heated Tipping Bucket	Other
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	130	RM Young	Other
Solar Radiation	63301	SPM	1	☐	1	N/A	MET	079	W/m^2	011	Instrumental-Pyranometer	Other
Std Dev Hz Wind Direction	61106	SPM	1	☐	1	N/A	MET	014	deg	020	Arithmetic Standard Deviation	Other (10m Tower)
Sulfur Dioxide	42401	SPM	1	☐	1	MID	SPP	008	ppb	100	Ultra-violet Fluorescence	Population Exposure
Sulfur Dioxide Max 5-min Avg	42406	SPM	1	☐	1	MID	SPP	008	ppb	100	Ultra-violet Fluorescence	Population Exposure
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10m Tower)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (10m Tower)

Rocky Creek

AQS Site Number **29-047-0006**

2-114 NW 132 St., Kansas City, MO 64165

Latitude: 39.33181 **AQCR:** 094 Metropolitan Kansas City

Longitude: -94.58069 **MSA:** 3760 Kansas City, MO-KS

Elevation (ft): 990

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Population Exposure
Ozone	44201	SLAMS	2	☒	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	-

Savannah

AQS Site Number **29-003-0001**

11796 Highway 71, Savannah, MO 64485

Latitude: 39.9544 **AQCR:** 137 Northern Missouri

Longitude: -94.849 **MSA:** 7000 St. Joseph, MO

Elevation (ft): 1120

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Population Exposure

Ozone 44201 SLAMS 2 ☒ 1 NBR COM 007 ppm 047 Ultraviolet Photometric -

South Broadway **AQS Site Number 29-510-0007**

8227 South Broadway, St. Louis, MO 63111

Latitude: 38.5425 **AQCR:** 070 Metropolitan St. Louis

Longitude: -90.263611 **MSA:** 7040 St. Louis, MO-IL

Elevation (ft): 452

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Barometric Pressure	64101	SLAMS	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Population Exposure
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other

St. Joseph Pump Station

AQS Site Number **29-021-0005**

S. Highway 759, St. Joseph, MO 64501

Latitude: 39.741667 **AQCR:** 094 Metropolitan Kansas City

Longitude: -94.858333 **MSA:** 7000 St. Joseph, MO

Elevation (ft): 845

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Barometric Pressure	64101	SPM	2	☒	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
Outdoor Temperature	62101	SPM	2	☒	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
PM10 - STP FRM/FEM	81102	SLAMS	3	☐	1	NBR	COM	001	ug/m^3	079	R&P SA246B TEOM	Population Exposure
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Population Exposure

PM2.5 - LC FRM/FEM	88101	SLAMS	5	☒	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Quality Assurance (Collocation)
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental- Computed (Indirect)	Other
Relative Humidity	62201	SPM	2	☒	1	N/A	MET	019	%humidity	020	Instrumental- Computed (Indirect)	Other
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (5.5 meters)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (5.5 meters)

Trimble

AQS Site Number29-049-0001

7536 SW. O Highway, Trimble, MO 64492

Latitude: 39.53063 AQCR: 137 Northern Missouri

Longitude: -94.55594 MSA: 3760 Kansas City, MO-KS

Elevation (ft): 1033

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State- Obj	AQS Unit- Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	NBR	COM	007	ppm	047	Ultraviolet Photometric	Max Ozone Concentration

Ozone 44201 SLAMS 2 ☒ 1 NBR COM 007 ppm 047 Ultraviolet Photometric -

Troost **AQS Site Number 29-095-0034**

724 Troost (Rear), Kansas City, MO 64106

Latitude: 39.10463 **AQCR:** 094 Metropolitan Kansas City

Longitude: -94.57040 **MSA:** 3760 Kansas City, MO-KS

Elevation (ft): 941

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Barometric Pressure	64101	SPM	1	☐	1	N/A	MET	059	mm (Hg)	014	Instrumental-Barometric Sensor	Other
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Nitric Oxide	42601	SPM	1	☐	1	URB	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
Nitrogen Dioxide	42602	SLAMS	1	☐	1	URB	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other (4m Probe Height)
Oxides of Nitrogen (Nox)	42603	SPM	1	☐	1	URB	COM	008	ppb	256	Teledyne API Model N500	Population Exposure

PM10 - LC/FEM/NonFEM	85101	SPM	6	☐	1	NBR	RES	105	ug/m^3-LC	639	Teledyne API T640x	Population Exposure
PM10 - STP FRM/FEM	81102	SPM	6	☐	1	NBR	RES	001	ug/m^3	639	Teledyne API T640x	Population Exposure
PM2.5 - LC FRM/FEM	88101	SLAMS	4	☐	1	NBR	COM	105	ug/m^3-LC	581	PM2.5 VSCC FEM or Thermo Scientific 1405-F	Population Exposure
PM2.5 - LC FRM/FEM	88101	SPM	6	☐	1	NBR	RES	105	ug/m^3-LC	638	Teledyne API T640x	Population Exposure
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	020	Instrumental-Computed (Indirect)	Other
Sulfur Dioxide	42401	SLAMS	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
Sulfur Dioxide Max 5-min Avg	42406	SLAMS	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented

Watkins Mill State Park

AQS Site Number29-047-0003

Watkins Mill Road, Lawson, MO 64062

Latitude: 39.40770 AQCR: 094 Metropolitan Kansas City

Longitude: -94.26539 MSA: 3760 Kansas City, MO-KS

Elevation (ft): 1009

Parameter	AQS Code	AQS Monitor Type	AQS POC	AQS Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Ozone	44201	SLAMS	1	☐	1	URB	COM	007	ppm	047	Ultraviolet Photometric	Extreme Downwind
Ozone	44201	SLAMS	2	☒	1	URB	COM	007	ppm	047	Ultraviolet Photometric	-

West Alton
*AQS Site Number***29-183-1002**

General Electric Store, Highway 94, West Alton, MO 63386

Latitude: 38.8725 *AQCR:* 070 Metropolitan St. Louis

Longitude: -90.226389 *MSA:* 7040 St. Louis, MO-IL

Elevation (ft): 425

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Indoor Temperature	62107	SPM	1	☐	1	N/A	MET	017	deg C	013	Electronic Averaging	Other
Nitric Oxide	42601	SPM	1	☐	H	NBR	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
Nitrogen Dioxide	42602	SPM	1	☐	H	NBR	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
Outdoor Temperature	62101	SPM	1	☐	1	N/A	MET	017	deg C	040	Electronic Averaging	Other

Oxides of Nitrogen (Nox)	42603	SPM	1	☐	H	NBR	COM	008	ppb	256	Teledyne API Model N500	Population Exposure
Ozone	44201	SLAMS	1	☐	1	URB	COM	007	ppm	047	Ultraviolet Photometric	Max Ozone Concentration & Population Exposure
Ozone	44201	SLAMS	2	☒	1	URB	COM	007	ppm	047	Ultraviolet Photometric	-
Relative Humidity	62201	SPM	1	☐	1	N/A	MET	019	%humidity	130	RM Young	Other
Solar Radiation	63301	SPM	1	☐	1	N/A	MET	079	W/m^2	011	Instrumental-Pyranometer	Other
Wind Direction - Resultant	61104	SPM	1	☐	1	N/A	MET	014	deg	065	Instrumental: RM Young Model 05305	Other (10m Tower)
Wind Speed - Resultant	61103	SPM	1	☐	1	N/A	MET	012	mph	065	Instrumental: RM Young Model 05305	Other (10m Tower)

Magnitude 7 Metals (PQAO - 2368)

Magnitude 7 Metals, Site # 1 AECL Water Tower Location AQS Site Number **29-143-9001**

391 St Jude Industrial Park, New Madrid, MO 63869

Latitude: 36.51364 **AQCR:** 138 SE Missouri

Longitude: -89.56093 **MSA:** 0000 Not in an MSA

Elevation (ft): 297

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Indoor Temperature	62107	Industrial	1	☐	1	MID	MET	017	deg C	013	Electronic Averaging	Other
Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented

Magnitude 7 Metals, Site # 2 East Graveyard AQS Site Number **29-143-9002**

391 St Jude Industrial Park, New Madrid, MO 63869

Latitude: 36.50838 **AQCR:** 138 SE Missouri

Longitude: -89.56074 **MSA:** 0000 Not in an MSA

Elevation (ft): 296

<i>Parameter</i>	<i>AQS Code</i>	<i>AQS Monitor Type</i>	<i>AQS POC</i>	<i>Coll</i>	<i>AQS Freq</i>	<i>AQS Scale</i>	<i>State-Obj</i>	<i>AQS Unit-Code</i>	<i>AQS Unit</i>	<i>AQS Method Code</i>	<i>AQS Method</i>	<i>AQS Monitor Objective</i>
Indoor Temperature	62107	Industrial	1	☐	1	MID	MET	017	deg C	013	Electronic Averaging	Other

Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
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Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
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Magnitude 7 Metals, Site # 3 West Entrance	AQS Site Number	29-143-9003
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391 St Jude Industrial Park, New Madrid, MO 63869

Latitude: 36.50899 AQCR: 138 SE Missouri

Longitude: -89.57099 MSA: 0000 Not in an MSA

Elevation (ft): 298

Parameter	AQS Code	AQS Monitor Type	AQS POC	Coll	AQS Freq	AQS Scale	State-Obj	AQS Unit-Code	AQS Unit	AQS Method Code	AQS Method	AQS Monitor Objective
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Indoor Temperature	62107	Industrial	1	☐	1	MID	MET	017	deg C	013	Electronic Averaging	Other
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Sulfur Dioxide	42401	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
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Sulfur Dioxide Max 5-min Avg	42406	Industrial	1	☐	1	MID	COM	008	ppb	060	Pulsed Fluorescent	Source Oriented
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Wind Direction - Resultant	61104	Industrial	1	☐	1	MID	MET	014	deg	065	Instrumental: RM Young Model 05305	Other
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Wind Speed - Resultant	61103	Industrial	1	☐	1	MID	MET	011	m/s	065	Instrumental: RM Young Model 05305	Other
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